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DISTURBANCES OF DIGESTION IN INFANTS, RESULTING FROM THE USE OF TOO HIGH FAT PERCENTAGES.*

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That serious disturbance of digestion in infants may be due to an excess of any of the milk constituents in the food employed, is a trite remark, and is the daily experience of all who see much of the results of infant feeding. The practitioners and the skilled nurses who direct the feeding of infants have come pretty generally to appreciate the symptoms which usually follow too high proteids, to understand what percentages of proteids an average infant may be expected to digest under given conditions, and how these percentages may be secured in the various milk formulas used. With the methods of home modifications of milk now in vogue, it is probably true that the proteid percentages of our formulas have been rather lower than higher than we have calculated, but often to the decided advantage of the patient.

But how is it with the fat? Personally, I have reached the conclusion that disturbances of digestion resulting from an excess of fat are quite as serious, if not quite so obvious, as those which follow the use of too high proteids, and that they need to be studied just as carefully. Even those who give special attention to infant feeding have been slow to learn the infant's capacity

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with respect to the digestion of fat, both in health and in the ever-varying conditions of disease. Others who have given the question less attention have fallen into error in one of two ways: In following the formulas of the books instead of using an ordinary milk, with a fat content of 4 per cent., they have substituted a rich Jersey milk containing from 5 to 5.5 per cent. fat. Thus unwittingly they have given from 5 to 7 per cent. fat when they had supposed they were giving a food containing 3.5 or 4 per cent. Or, they have made another mistake of intentionally increasing the fat, almost without limit, for the purpose of overcoming that most troublesome symptom in artificial feeding—chronic constipation.

Errors like these are exceedingly common and their consequence may be very serious. It is the purpose of the present paper to record some of the results seen with such feeding, all of the cases cited having come under observation in private practice in the course of a few months.

CASE I.—*Over-feeding with high fat, rapid increase in weight and progress in development till eight months; then general convulsions, followed later by tetany, laryngismus stridulus, fatty liver (?)*. Recovery after three months' illness.

In February, 1904, I was asked by a physician to see a baby of a medical friend whose feeding he had directed. The child had been considered a magnificent specimen of physical development, and a great triumph of the feeding art, until one week before my visit, at which time his weight, at eight months old, was twenty-one pounds. In the previous three-and-a-half months he had gained ten pounds. The child had bright rosy cheeks; was strong in his muscles, already pulling himself up by the side of his crib and bearing his weight on his feet; and was for his age well advanced mentally. He seldom vomited; had a good appetite, and was taking, until a few weeks before I saw him, seven feedings of 6 ounces each, but lately only six feedings, of a mixture made up as follows:

The upper 16 ounces were taken from each of 2 quarts of a rich Jersey milk (Briarcliff Dairy); 24 ounces of this top milk were used in a 40-ounce mixture. Examination of the top milk used showed it to contain 10 per cent. fat, so that the baby was receiving in his food not less than 6 per cent. fat. With this food the bowels usually moved twice a day; the passages being smooth, large and yellow. An occasional restless night and some tran-

sient urticaria were the only clouds in the otherwise clear sky until February 16th, when a stool not well digested was reported, with loss of appetite. These were not enough to make necessary any change in food.

The following morning, one hour after feeding, the child had a severe general convulsion which lasted from six to eight minutes, followed by a second one three hours later. The stomach was promptly washed out and all food stopped; calomel given and later castor-oil; then bromide of soda. Five loose stools followed this treatment, none of them especially foul. There was no rise of temperature and no signs of serious illness. The following day, as no unfavorable symptoms had occurred, the previous food was begun, but much diluted, the proportions being one part of the food to five parts of water. The strength of the food was gradually increased, so that at the end of four days the baby was taking 5 ounces of his original food diluted with only one ounce of water. During the next night some severe pain occurred, ascribed to colic; the next morning the temperature was 104.5° F. I saw him first early in the afternoon. He was, as he had been described, a splendid looking child. The fat lay in great folds over his body and extremities. Fontanel large, but no other evidences of rickets; no teeth. Liver much enlarged, the lower border being nearly two inches below the costal margin. Hands and feet in typical position of tetany, considerable muscular rigidity, movements painful; temperature 103.5° F.

A second clearing out of the intestinal tract was advised, and the first stool passed was examined chemically and found to consist of almost pure fat. All food was omitted for one day, all milk for a week, and then very low fat percentages given. The tetany gradually passed away, but was followed three weeks later by laryngismus stridulus which continued for nearly three weeks. There was much trouble with the digestion for the next two months and the child lost 5 pounds in weight.

When last seen, three and a half months after his severe attack, he was digesting well and thriving, but his weight was only 19 pounds.

Several points of interest in this case deserve attention; (1) the long period during which the child bore the high percentage of fat without any apparent disturbance; (2) the severity of the nervous symptoms, the suddenness with which they came on and their long duration; (3) the prolonged disturbance of the diges-

tion and general nutrition; (4) the large liver (*paté de foie gras?*) and stools consisting of almost pure fat.

CASE II.—*Prolonged feeding with high fat, notwithstanding which constipation and the development of moderate rickets, followed by acute disturbances of digestion with repeated convulsions.*

This patient was also seen in consultation within a few days of Case I, and the symptoms presented many points of similarity. The milk used was from the same dairy; it was prepared after almost the same formula, except that the percentage of fat in the food as given was only 5 per cent. The patient was the first child of healthy parents, nursed for three months, had suffered somewhat from facial eczema at six months, after which barley water had been substituted for plain water as a diluent. For the past month the child had been taking the following formula:

Top milk.....	19 ounces.
Barley water.....	21 ounces.
Sugar of milk.....	4 even tablespoonfuls.
Milk of magnesia....	1 teaspoonful.

The top milk was the upper 16 ounces from 1 quart of rich Jersey milk and had been estimated by the physician to contain 7 per cent. fat. The child was taking 6 ounces every three hours. With the addition of the magnesia the bowels moved regularly, but the stools were pale yellow. The formula begun after weaning had been a similar one with a little lower proportion of milk. The baby was gaining from 6 to 8 ounces a week and his weight at the time of my visit, when he was eight months old, was 18¾ pounds.

There had been no vomiting, the child had a good appetite, slept well, and was considered to be in the best of health.

One week before my examination, without any change in the food or other assignable cause, the child had a slight convulsion in the evening. The following morning a second and more severe one. The temperature was elevated up to 103° F., and the child gave the appearance of being seriously ill. Food was stopped, the bowels cleared with calomel followed by magnesia, and the temperature quickly fell to normal. The child improved rapidly, and he was put back on his previous food, at first diluted, but strengthened daily until at the end of three or four days it was two-thirds the original strength. One week after the first con-

vulsions, he had a third, and later in the day two more. I saw him in the evening. He presented all the appearances of a splendid, healthy, well-developed child with bright red cheeks, plenty of fat, and muscles well developed. The head was well shaped, but craniotabes was present; no teeth. Physical examination otherwise negative. All food was stopped for twenty-four hours and a second clearing with calomel ordered. All milk was stopped for a week and then a mixture containing a low fat substituted. Three months later I saw the child again. He had one convulsion six weeks after the first group, apparently from a slight attack of indigestion. At the last visit he was in excellent condition, still no teeth at eleven months, with moderate head sweats, but general condition otherwise excellent. The craniotabes had disappeared.

It was interesting to note the development of rickets and the presence of constipation, in spite of the excessive amount of fat which his food had contained ever since he had been weaned at three months.

CASE III.—*Over-feeding with high fat—convulsions.*

This was an office patient six months old, the second child of healthy parents, whose weight at birth was reported as 8¾ pounds. The mother had nursed for a few weeks; then discontinued on account of illness. The child had been fed upon a milk modified at home; the proportions were stated to be as follows:

Milk	12	ounces.
Cream	4½	"
Lime water	1½	"
Water	14	"
<hr/>		
Total	32	"

The child was given 5½ ounces every three hours. The cream used was examined and found to contain 35 per cent. fat. The proportion of fat in the food was thus about 6.75 per cent. Upon this mixture the child had gained very rapidly in weight, had had from three to four yellowish stools daily, occasionally containing masses called curds, and its progress had been considered most satisfactory until the age of four months. There had been some vomiting, but this had never been very troublesome. At four months old a severe general convulsion occurred lasting twenty minutes, a second convulsion two hours later. The food

was reduced to a mixture of equal parts of milk and water, which was continued for a few days; but as the child did not gain as rapidly as before, the mother on her own responsibility had returned to the original formula. The father, a dentist, being convinced that the convulsions were from dentition, ascribed great benefit to gum-lancing, which was practised. After the first convulsion the general condition was not so good, slight symptoms of indigestion were present—regurgitation of food many times a day, much flatulence and stools usually yellow, but occasionally green. Examination showed a moderately fat infant, pale, flabby, without signs of rickets.

The cream was omitted from the formula and milk substituted reducing the proportion of fat to about 2 per cent. The child made satisfactory progress from this time, had no further convulsions and its symptoms of indigestion rapidly disappeared.

CASE IV.—*Habitual vomiting aggravated by high fat; serious gastric catarrh produced; finally cured by stomach washing.*

This was an infant ten months old, also seen in consultation. The chief symptoms in this case were continued wasting with persistent vomiting. The vomiting had begun almost from birth and had been a most troublesome symptom up to the time of my visit. A great variety of infant foods and milk formulas had been employed, none with any very great success. Up to the eighth month the food had been for the greater part of the time barley water and condensed milk. For the past two months the child had been in the care of a physician who is enthusiastic in the feeding of high fat. The formula used had been:

Top milk	17	ounces.
Water	13	"
Lime water	2	"
<hr/>		
Total	32	"

The child was given four feedings, 7 ounces each; the interval between feedings, four hours. Occasionally an extra feeding was given during the night. The top milk was the upper 17 ounces from 1 quart of the Briarcliff milk. According to two analyses of similar samples, the food contained as given about 5.30 per cent. fat. During the two months that the child had been on this diet, his weight had fallen from 9 pounds 8 ounces to 8 pounds 4 ounces. His vomiting had not improved; in fact, had grown

steadily worse. Now not only was food rejected, but frequently mucus in large amounts at some time almost every day. The child had never had any acute disturbance of digestion; the bowels were constipated.

Examination showed a typical marasmus child. Head 16 inches, chest 14 $\frac{1}{4}$ inches, length 23 $\frac{1}{2}$ and weight 8 pounds 4 ounces; at ten months his weight being only 2 $\frac{3}{4}$ pounds more than at birth. After one or two minor changes the child was put upon the following:

Plain milk.....	18 ounces.
Water	7 “
Lime water.....	5 “

This was peptonized. He was given 5 ounces every four hours; five feedings daily. Stomach washing was begun, at first daily and then every other day. Large amounts of mucus, often as much as two ounces at a time were removed. With the stomach washing the mucus rapidly disappeared and the quantity and strength of the food were increased. The stomach washing was continued at longer intervals for a period of nearly two months, during which time the weight steadily increased. At the end of four months he had gained 6 $\frac{1}{4}$ pounds. The progress from this time was rapid and uneventful, and one year afterward the child was reported by the attending physician to be fat, rosy and in the best of health.

The condition had been in this case persistent gastric indigestion with excessive fermentation, continuing until a gastric catarrh of serious proportions had developed. The high fat mixture which had been ordered had greatly aggravated this condition, and the state of the child at my first visit was really an alarming one.

CASE V.—Feeding with high fat; eczema, habitual constipation, and finally, habitual vomiting.

This case is an illustration of the very rapid gain in weight and subsequent development of serious digestive disturbance from very high fat. The child at birth was very large and robust, his weight being 11 $\frac{1}{2}$ pounds. He had increased rapidly and at eight weeks old his weight was 15 pounds; at three months it was 17 pounds 10 ounces. The weekly gain during the greater part of the time was from 12 to 15 ounces. The formula used had been:

Top milk.....	24	ounces.
Water	22	"
Lime water.....	2	"
Mellin's food.....	3	tablespoonfuls.

The Mellin's food had been added to overcome the chronic constipation. The top milk consisted of 12 ounces removed from each 2 quarts of the Briarcliff milk, the same dairy as that which supplied the milk in three of the preceding cases. The proportion of fat in the food given was approximately 7 per cent. The mother reported that the child had always been constipated, and that he had had no natural movement for three weeks, enemas or glycerin suppositories being usually required to induce one. The stools passed were large, dry, and a light yellow color. There had been a good deal of straining and, finally, a rectal prolapse had developed. The vomiting at first had been slight, but recently had greatly increased until it had become very troublesome and was repeated several times each day. He had an excellent appetite and seemed never quite satisfied with the food given. A troublesome eczema of the face had appeared about the third month.

It was interesting in this case to see that the constipation greatly improved when the fat in the food was reduced to 4 per cent.; but it was not entirely overcome until the fat was reduced to 3 per cent. The symptoms of indigestion and eczema continued to be troublesome for the next two or three months, but no serious symptoms occurred, and the progress on the whole was satisfactory.

It would be easy from my records of private patients to multiply almost indefinitely examples of acute and chronic disturbances of digestion in infants from the use of too high fat. Those cited, however, illustrate the most frequent and the most serious types. Often the very rapid and unusual gain in weight goes on steadily until the acute upset comes. In other cases the results of such feeding are shown in a gradual loss of appetite, sometimes so complete that for weeks a child will hardly take one-third of his former food. The increase in weight now ceases and there may even be a steady but a slow loss. In such cases the infant seems to take into his own hands the matter of cutting down his food and thus prevents serious acute disturbances of digestion.

That gastric disturbances—habitual vomiting or regurgitation of food, continued fermentation and finally the production of a

gastric catarrh—may follow the use of very high fat has often been emphasized; but it is not so generally appreciated that disturbances of intestinal digestion may also occur, and that even chronic constipation may be greatly aggravated by such feeding. The hard, dry, gray stools passed under these conditions frequently consist almost entirely of undigested fat. Steadily raising the proportion of fat because of the constipation is the plan often followed, and this makes matters worse.

Severe nervous symptoms, such as occurred in several of the cases, have not in my experience been very frequently seen from this cause, and I do not feel convinced that the form of auto-intoxication present was entirely due to the fats, although this is possible. The symptoms were not very different from those which accompany other forms of acute digestive disturbance.

There are some practical conclusions to be drawn from these cases. It is evident that the errors into which both physicians and patients have usually fallen have resulted from their fondness for rich Jersey milk and cream. Although there is pretty general agreement among those who have given special study to the question of infant feeding that milk from other herds, containing from 4 to 4½ per cent. fat, is better, still a great majority of the profession and the public will turn from such milk as being thin and blue to the rich yellow product of the Jersey or Alderney herd. I believe that one of the chief causes of failure in feeding from the milk laboratory has been the use of too high fat, it being so easy for a physician under these circumstances to increase the fat percentage, particularly if his mind has been filled with the idea that thereby chronic constipation is likely to be overcome.

Mistakes like those above described may be avoided if the physician knows approximately the fat content of the milk, cream or top milk which he is using. Too often he falls into error by disregarding this entirely and treating all specimens of milk and cream alike, using them in the formulas which he may have obtained from some book. More definite results may be obtained in several ways. In the first place, the physician may obtain from the milk laboratory a cream or milk of a definite fat percentage and thus be able to calculate closely the amount of fat which his patient is taking in the formula given. Or, he may himself examine the milk, top milk or cream, which his patients are using. His advice is generally asked in the choice of the milk supply and if he habitually uses milk from the same dairy he can be fairly

certain of his results. Such examinations with the Babcock tester, or some of its modifications, can be made in a few minutes, or a specimen may be sent to a laboratory and the fat determination had for one dollar.

In order to interpret correctly the result of these milk examinations he must learn to think in percentages. In no other way can one form any idea of how much fat he is giving. Although a little difficult at first, it soon becomes easy. To a student of medicine there does not seem to be very much difference between a temperature of 103° and one of 106° , yet how different is the meaning they convey to the practitioner. In the same way milk percentages at first signify little to one unaccustomed to using them, and where the increase is made by percentages at the milk laboratory, often the most injurious combinations are ordered. A friend told me of a physician who was feeding his own child on milk from the laboratory. The formula used was one containing 3 per cent. fat. As the child was not gaining very well, he decided that an increase was needed and ordered milk containing 6 per cent. fat. He then abused the laboratory because his baby's digestion had been upset by the milk.

As to how much fat may be wisely given to infants in health, opinions may perhaps differ somewhat. I am not sure that any arbitrary standard can be fixed. Children differ very much in their capacity to digest fats as in other respects; but there is a limit with each child beyond which we may not safely go. If the percentage is raised very much above this for any length of time disturbances are almost certain to follow. Personally, I have never seen any advantage, but often much harm, from raising the fat above 4 per cent., and in my own practice I have fixed upon this as about the limit for the average child.

The physician who assumes to direct the feeding of infants must have some notion of what is proper, must know what he is giving and must appreciate the difference between giving a food which contains 3 or 4 per cent. fat and one containing 6 or 7 per cent. Although the bad results of the higher percentages may not be at once apparent, they are almost certain to come later. Furthermore, simply to raise the percentage of fat seldom relieves chronic constipation; and, finally, whenever there are marked symptoms of either gastric or intestinal indigestion, the fat should be reduced much below the normal 3 or 4 per cent.

14 West 55th Street.

DISCUSSION.

DR. NORTHROP.—I am particularly interested in Dr. Holt's paper and would like to call attention to some experiments made at the Presbyterian Hospital, New York, with rickety children. Believing that they should have cod-liver oil, I decided to save the cod-liver oil bill by super-fatting the milk. As a result the children became constipated with hard, dry, crumbling feces and vomited, showing some irritation of the stomach. I am fully convinced of the undesirability of using above a 4 per cent. fat. I am pleased with the paper because it coincides with my own views on this matter regarding the amount of fat. Sometimes, however, there are many difficulties in overcoming the prejudices of grandmothers in regard to proper milk for the babies. The key to the situation in infant feeding I got from Dr. Rotch: Keep the formulas "level"; not giving way to violent changes and disturbances of proportions.

DR. KERLEY.—With regard to the high fat feeding, in the New York Infant Asylum, I have never been able to use a higher fat than 2 per cent. to children under six months of age. I find they are less susceptible to intestinal derangements and thrive better in every respect upon a low fat with a moderately high proteid.

I agree with Dr. Northrup in his remarks about laboratory feeding; I believe one could get better results from laboratory milk than from home milk, even with the addition of cream or top milk; there is too much guess work in modifying milk at home.

DR. FREEMAN.—With regard to high fat feeding, I think much error is caused by ignorance as to what cream is. Many of the books prescribe cream and do not state whether it is cream obtained by centrifuging or not; in other words, whether it is a 40 per cent. instead of a 16 per cent. fat. The use of low fats has been well worked out in Straus's milk in New York City. Straus uses no cream in his modifications at all; the children do well upon it.

DR. CRANDALL.—What was said by Dr. Holt in reference to constipation is important and is what the general practitioner should bear in mind. Not many years ago many physicians seemed to think that babies could not get too much fat. It is interesting to note that every instance he recorded was fed upon one kind of milk, which was a clean milk and its production and distribution was well managed. But I think that 5.5 per cent. fat too high to be used for home modification.

DR. MORSE.—Eczema is often due to too much fat. Another sign which I have not seen mentioned as the result of too high fat percentage, is ammoniacal urine. That the ammoniacal condition of the urine is due to high fats was proved by the fact that the condition ceased when the fats in the food were reduced. The

only explanation of this which I am able to give is, that during saponification a large amount of fat takes up an excess of alkali from the intestine. In order to avoid too great a loss of alkali the organism is obliged to manufacture ammonia to take the place of alkali absorbed by the fat in the intestine. The urine then contains much ammonia. It has been my experience that when too much fat is given it is not due to the use of too rich milk, but to the fact that doctors and nurses do not understand what was meant by top cream and top milk. They do not realize that it makes any difference whether milk has set six, eight or twelve hours, or whether the top 6, 8 or 10 ounces were taken. I believe that much missionary work is to be done in this direction.

DR. ROTCH.—What I have heard makes me believe that the study of fats should be carried on more extensively than it has been in the past. In the intelligent study of the use of fats I think we should direct our attention more to knowing what was given. Young babies have a fairly strong fat digestion. In some cases high fat percentages produce constipation, and in others diarrhea; this I believe to be due to a gradual weakening of fat digestion. Babies may at first have a perfect fat digestion, which can gradually become weakened and develop a series of nervous symptoms. On the other hand, there are cases in which a low fat percentage will give constipation; here the constipation may be obviated by increasing the fat. It is important to know what one is giving and not simply speak of top milk, etc. I advise that in the future, by knowing what is being given, efforts should be made to gain information on this subject and reports made to the Society.

DR. RACHFORD.—I should like to inquire what causes these nervous symptoms in fat feeding; is it not an autointoxication from the intestinal canal?

DR. LA FÉTRA.—With regard to symptoms of fat indigestion the vomiting of quantities of mucus after several feedings is usually connected, I think, with a temporary spasm of the pylorus. In cases of acid vomit with mucus, as in fat indigestion, there is a large amount of this mucus which was formed after, and vomited after, long periods of time. It seems to me that there is an acid stimulation of the muscular layer at the pyloric end of the stomach which causes this vomiting.

With regard to laboratory feeding of babies it has been my experience that home modification, teaching the mother and nurse how properly to modify the milk, is most satisfactory. Personally, I have had no difficulty in getting the milk modified with sufficient accuracy. If the physician is careful and gives written instructions to the mothers and nurses no trouble will be experienced in the home modification.

DR. PUTNAM.—The required information that is so valuable

in estimating the high or low percentage of fat can be readily obtained by means of the Babcock tester.

DR. WINTERS.—The cases of convulsions reported by the reader of the paper are not in any way related to high fat percentages in the food. They are typical examples of convulsions due to too frequent feeding. Children of eight and ten months should not be fed every three hours. Children of eight and ten months should have a cereal added to the milk, as milk of sufficient strength to maintain nutrition at this period is more digestible when combined with a cereal. The constipation from which these children suffered was the result of insufficient proteid for the formation of muscular tissue and the proper development of the muscular wall of the intestine, with the result that there was lack of contractile and expulsive power. Here, again, a cereal would have been invaluable in promoting the laying down of muscular tissue, and in giving bulk to the intestinal contents, which would have promoted regularity of the bowel.

DR. JACOBI.—I have been writing on this subject for forty or fifty years and yet I cannot settle the question for you. In none of the cases reported has anything been done to ascertain the *cause*. In those cases in which indican to any large amount is found in the urine there is proved to be an intoxication. What is it that permits little babies to tolerate so much fat that older babies cannot tolerate? But that is not the fact at all; little babies cannot tolerate fat to such an extent. When babies cannot stand fat any longer they break down; though a baby will stand much hard treatment. If every child that was maltreated died, very few of us would be alive today. Babies six or eight months of age, when they cannot stand the fat any more, break down under the strain.

With regard to constipation while so much fat is taken, the reason is simply this: Insufficiency of the muscular layers. Those babies are fat, rotund and weigh very much; but this is only fat and not muscle; the muscular insufficiency of the intestines cause the constipation, as it does in every rachitical baby. Part of Straus's milk in New York is being made from a prescription I have been teaching these forty years, and here the fat is only a little over 2 per cent.; on this I believe a child will thrive.

Still, I hope this subject will be further studied, especially by Dr. Rachford; clinical observations like those brought up here are good things to know.

NERVOUS EXHAUSTION IN INFANTS.*

BY W. P. NORTHRUP, M.D.,
New York.

It was said that a baby of four months, living in a neighboring city, was slowly fading away; that if something was not done for it soon, it would be too late. The history as related by the mother was substantially as follows: For the first three months the baby was a good sleeper and ravenous feeder, particularly happy and strong. It was stated that he was a good-natured baby, would wake from sound sleep and smile, at any hour, day or evening, for callers. It was nursed at its mother's breast and she had milk enough.

My presumption was that the young mother's milk was now failing, that judicious feeding would soon put the child into good condition, the mother would go home happy, and with her my reputation brilliantly enhanced. A naturally strong baby, wet-nursed through the fourth month, seemed to present an easy feeding problem.

The first look at the mother showed a naturally strong, but worn-out, thin and pale young woman. She had recently been through a strenuous horse-show week, trying at the same time to entertain a houseful of friends and to nurse her baby; and she looked it. The baby, too, looked thin, white, but very alert. It jumped at any noise, smiled spasmodically, twitched, had dark circles under its eyes. The mother, with most engaging smile, declared he was the brightest, best-natured and strongest baby in her city. She said he slept all night, and nursed every time she offered him the breast.

After its journey it was, of course, tired but still alert. The mother said: "He was very cunning in the train (seven hours); he never closed an eye, looked at everybody and everything, visited all about the parlor car, entertained everybody and was pronounced the best-natured baby ever seen."

A sunny south room was provided for baby and nurse, the entire third floor constituting the hospital. A baby carriage and Walker-Gordon modified milk were waiting, and I may say the entire domestic and professional plant of my house was at the service of this bit of humanity. Incidentally, I may add, it strongly resembled in appearance one of the average inmates of

* Read before the Sixteenth Annual Meeting of the American Pediatric Society, Detroit, Mich., June 1, 1904.

the Marasmus Room of the New York Foundling Hospital.

At sight, my courage suffered a severe shock. On this case there hung many hopes and incidentally my reputation.

It must be fed, of course. It had for some hours taken but little, some soup from the buffet in the train—just-add-hot-water-and-serve canned soup, you know. A bottle of the most approved modification of the best of New York's milk product was given to the one-third of a year old infant. He engulfed it in the shortest possible time, while all the friends stood in a circle to see the beginning of the miraculous cure—a delivery from fading and wasting. He seemed to want more. His eye was brilliant, his look alert, he was truly something intellectual.

An incidental remark from the mother that he was "keeping this feeding down," enlightened me. He was accustomed, then, to spit up most of his food; she had scarcely finished when a sudden jet of milk, with high muzzle velocity, made the longest record-flight into air. He took 4 ounces and vomited, apparently, 5. He was tired, excited; his stomach had revolted.

The baby was to be weaned from the mother's breast and fed on modified milk. The mother had practically no milk. The first prescription was a low average Walker-Gordon milk modification. After each feeding he habitually spat up little or much. His accustomed nurse took care of him. She was faithful, but not trained; not wise, but willing to obey.

It was gradually discovered that his feet were always cold, that he was most of the time wet, that he took his bottles rapidly, that he kept his food better at night. These were more points of information.

His feet warmed, his feedings given in a darkened room, his nurse soothing him and all his surroundings tranquil, he did somewhat better. He was thought to do better in the air. Central Park was near, and moderately quiet. All efforts to keep him from ejecting some or all of his food failed and really for the moment the situation was discouraging. A week had passed and no real improvement. Indeed, the tiny thing was smaller and had lost his good humor. He wailed night and day, slept hardly at all. The pediatric household was depressed. No results toward cure, reputation going.

At this point a good child's nurse was found, one who not only was trained and experienced, but had some intuitive insight into the needs and comforts of an infant.

The instructions were to keep the baby in Central Park just as many hours a day as possible, eight hours not being considered too much. Fancy my surprise then on my return home about four o'clock to find the nurse and baby in the sunless backyard, north side of house, and that they had been there two or more hours. I was in an explosive mood, and making straight for the offending parties. Psh-psh-ee-ee-hh, was my greeting; a commanding look in the eye of the triumphant nurse made me pause. The child was getting its first sleep. For three and one-half hours that little moaning, starting, pale and wasted baby slept face downwards, lying across the arms and lap of the nurse. She had found Central Park too noisy. The sounds made the baby jump and wake. Here it was quiet. It would not sleep in its carriage, so she took it on her lap. At last she found it would sleep only in one position, viz.: stomach down. For three and one-half hours the faithful little woman walked or casually sat a moment, gently soothing the worn-out nerves. For three and one-half hours it slept. It was its first good sleep. From that day the improvement began. From that moment the problem was solved. Nerve rest was imperative. The nurse saved the day, instructed the nurse maid, taught the doctor, cured the baby.

The exhibition of a four months' baby with nervous exhaustion, nervous dyspepsia, prostration, cured by a wise nurse, by rest treatment, is worth contemplation by all teachers and practitioners of pediatrics.

The recovery, of course, was slow. After three weeks it had gained three-quarters of a pound, was sleeping, taking good, large feedings of whole milk. From my house it sailed for Liverpool, was the only good sailor in the party, is now in rude health, is noisy and marring furniture.

After the diagnosis was made the early history of the infant was reviewed, and is as follows: The baby made a good start in life. After a few months social demands began to wear on the mother, and the milk suffered. In addition to all this was the incessant wear on the child's nerves. Their house was upon a most noisy trolley corner, where the din and clangor was so great that my backyard in New York City was like drowsy Cathay. The infant had many relatives, its full quota of grandparents, a great grandmother, many aunts and uncles. The young pair had hosts of friends, and all of them endowed with an inordinate superhuman fondness for babies. This found expression in wak-

ing the infant from sleep, kissing it, jumping it in the air, making it smile and coo and gurgle. It was an engaging baby and was most of the time engaged. The father had the pleasing habit of entering his own house with a bound, and discharging a war-whoop to announce himself to his young wife. This, of course, put an end to sleep and tranquility for the baby. Then followed a short gallop with the three to four months old infant, after which other affairs led the lord and master thence—unless perchance he met friends. If he did, he brought them in to see and jump and kiss the baby. By this time it was feeding time, if indeed the feeding had not been hastily engulfed in anticipation of the chance invasion.

It was noted as a precocious and pre-eminently cunning thing that this four months' son of the prize tandem driver should sit on his father's lap and lay his little white emaciated fingers on the lines as though driving. His rolling eyes looked out upon the kaleidoscopic mingling of human beings, horses and traps, "in such a sporty way," the mother said. Save the mark! A bulging-eyed marantic infant, starving and wasting, paraded by young, ignorant and proud parents, and calling him "sporty!"

This four-months-old baby was properly born, reasonably well started on the first months of life, nursed by its mother. By the third month it began to get thin, pale, to spit up food and by continuous, injudicious excitement and gradually failing breast food, soon got into a condition of nervous dyspepsia, until it finally was unable to retain and digest sufficient food to allow it to thrive, and was now wasting from starvation.

All this was corrected by quiet, the judicious care of a wise nurse, a new-found, wise, soothing, comforting, quieting little woman, who liked the baby, took it naturally to her arms and enveloped it in such a warm embrace that it sank into a few short startled sleeps; then, finally, stretched out into one long relaxed infant's slumber, from which it emerged with sleepy winks and stretchings, the like of which it had scarce ever known. This first long sleep taught its lesson. Quiet surroundings were indicated. The infant was fed in a dark room. All bells, telephones and unnecessary noises were either muffled or reduced. Cotton was put in the infant's ears. Above all, this wise nurse was given sole charge of the infant. The presence of the father and friends were injurious to the child, the mother was too worn-out and nervous to be anything but harmful, the baby's usual nurse was

also exhausted and nervous. The result was that in a fortnight the baby was feeding on maximum diet, sleeping perfectly and gaining weight.

It has thrived ever since. Last week a letter came announcing the fact that the baby was one year old and had eight teeth, and is "the finest colt in the paddock" (sporty father).

Another case is of much the same history. A young couple from the Southwest on their way to Newport stopped over in New York for a few days and wished to have the baby, five months old, examined in a routine way, to see that it was thriving and that all was being done for it that was possible. This sounds very noble and high-minded, but it really arose from a kind of vanity on the part of the parents. They thought that all, on seeing their infant, must throw up their hands in approval and applause.

Briefly, it was pale, thin, wide-eyed, alert, encircled under the eyes, starting, spitting up. Advice and admonition were accepted, but by no means appreciated. It was as though one were discussing ancient history; nothing said was taken to themselves.

On their return to New York, the child looked a little tanned, a little better, on the whole, but was nervous and spitting up food.

A friend confided to me that every day in Newport this father and mother went along the ocean drive in the crowded hours, in an automobile, with the baby facing forward and witnessing the parade. Not only that, but about half the time the proud father was tossing it, and facing it this way and that way, exclaiming: "See, see the wheels, see, baby, see the horses, *see, SEE!*" It was even noted by the most dull that the mother and baby both looked nervous, starting and wide-eyed.

By the end of the season in Newport, the father was fairly well, the baby nearly worn out, and the mother quite finished. She left in a few weeks for the baths of Bohemia and spent a year recovering from seeing too many wheels and horses. I heard no more of the baby, but doubt not it is alive and a subject for Bohemian baths.

I think we all see certain members of a family, whose nervous systems are peculiarly sensitive to the nagging of other members. I spent a summer where a little girl was quite a painful exhibition of this. The girl was the youngest of three. The older were strong, stamping and tempestuous, fond of noise and confusion and accustomed to late hours. The youngest was thin, pale, quiet,

sensitive, had an artistic temperament, was easily annoyed and teased, a poor sleeper. The older children goaded her without mercy. The parents, wholly oblivious of the situation, scolded her—worse than all, did not sympathize with her. She was like a little despairing, heart-broken thing, her nerves worn out, her sleep and digestion impaired, her only hope that the summer vacation would end and the family get busy enough with their usual home duties to leave her alone.

In February and March we see many cases of nervous exhaustion in school children. They are pale, jerky, choreic, talking in their sleep, sleeping too little, becoming dyspeptic.

This paper is to call attention to nervous exhaustion in infants. In the work of this Society it is desirable to teach the lesson of quiet surroundings, especially of allowing a certain quiet to initiate stomach digestion. It points to the necessity of close, constant watching, and individual-case-studying.

We need not interest ourselves with the mother who takes a year at the baths to recover from the strenuous life of the winter and summer. We should, however, try to protect the coming generation from nervous exhaustion, nervous dyspepsia, sleepless nights and choreic jerkiness before they have cut their first teeth.

DISCUSSION.

DR. COTTON.—I have had the same experience with a girl past nine years old, who came back from her vacation worse than when she left. There is a foolish notion among the Chicago people that they must go away in summer. Time and again the children are brought back more tired than when they went away, especially those with high-strung, nervous temperaments. So much depends upon the environment and habitat, etc., that each case should be decided upon its individual requirements.

DR. CAILLÉ.—Much of the trouble is due to the excessive activity of the times. So far as the management of children is concerned I believe the average physician is much to blame. In my section of the country the hysterical doctor is the most popular man, and, I think, he is much to blame for the conditions Dr. Northrup criticises.

DR. PUTNAM.—Dr. Northrup has spoken of the wonderfully good influences which a nurse is able to exert on a nervous child, but it is worth mentioning that sometimes highly esteemed nurses have a bad influence even on little babies that is equally wonderful, and often not recognized by parents. I am always shy of a nurse who has had the reputation in a former place of staying awake all

night with a nervous and restless child, for, as likely as not, it was the nurse who had kept the baby awake, not the baby the nurse. Under such women babies formerly placid and happy become restless, nervous and sleepless.

DR. ADAMS.—We should beware of the nurse who puts the children to sleep. It has been my experience to come across such an excellent nurse, who came highly recommended, who had influence over babies, and could make them sleep for twelve hours continuously. I protested against this nurse and told the family that the child, only three or four months old, should not be allowed to sleep all night. One night the nurse did not appear and the child was awake nearly all night. This nurse finally admitted administering "knock-out drops." This happened in two instances, one being a white nurse, the other a black one. I would caution particularly against the much over-rated southern "mammy."

DR. FREEMAN.—Besides the general disturbances there are the neurasthenic conditions to be considered, many of which are so difficult of cure. In cases of nocturnal enuresis the mother and nurse have an influence, and the children may often be cured by placing these children in the hands of a trained nurse. Many cases of constipation in infancy are caused by the influence of environment and can be remedied by placing the children in proper environments.

DR. CHURCHILL.—All must be impressed with the growth of nervous conditions in American life in both adults and children. Much can be done to correct this by general direction of the child's life and a careful investigation of all the surroundings and environment of the child. I recall a child, two or three years old, whose parents were neurotic. The child was extremely nervous and slept only from 10 P. M. till 4 A. M. I was the fourth physician to see this child. He looked perfectly healthy, but an examination of the blood and urine showed that the child was anemic and passing a urine deficient in the amount of solids. After regulating the diet and hygiene the child slept better and improved. President Eliot is right when he says that the salvation of the child is in getting him out of the city: he should have as many months away from the city as possible. It is far better to send children away, especially to the seashore, where there is salt air and salt-water bathing—*e. g.*, to the south of Cape Cod. I would advocate the establishment of more common sense schools where there is no competition for prizes. The latter are excellent things to abolish in schools.

DR. NORTHROP.—It seems as if adults are conspiring to ruin the in-coming school children by offering so many prizes. The children who always sit in the front seats are usually a crop of "choreics," a most distressing sight. The good students usually give a crop of neurotic "jerkers."

STUDY OF A CASE OF HODGKIN'S DISEASE.

PRIMARY DIAGNOSIS, MALIGNANT LYMPHOMA, FINAL COMPLICATION, PULMONARY TUBERCULOSIS.*

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We present the following report of a case of Hodgkin's disease which has been under the observation of one of us for four or five years, first in the Children's Hospital in the service of Dr. John Parmenter, and later in the Buffalo General Hospital in the services of Dr. Roswell Park and Dr. Charles Cary. It is through the courtesy of these three gentlemen that we are able to record the case. We report the case as one which may form a group toward helping to clear up the classification of this disease, which has received more or less study since it was first brought to the notice of the profession by Hodgkin in 1832.

It has since been called by numerous names; Hodgkin's disease, pseudoleukemia, anemia lymphatica, adénie, malignant lymphoma, lymphadenoma, lymphosarcoma, etc. The variety of names shows the difficulty of finding a satisfactory causal factor, but the common opinion leads to that of an infection, whose cause is not known.

In reviewing the recent literature of the disease, we find in Sailer's article "The Relation of the Tubercle Bacillus to Pseudo-leukemia," the report of 4 cases. In 2, the first and third, cough and expectoration were early symptoms and soon the tubercle bacillus was found. In another, his fourth case, there is an early history of jaundice with later a "hemorrhage from the nose and mouth," and a short time later the lungs were found involved. In still another, his second case, the first symptom was a fluctuating tumor over the sternum, followed later by a lung involvement, which at necropsy showed a recent miliary involvement. Consequently in 2 of these cases tuberculosis pulmonalis was

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proven early enough to make the tubercle bacillus a prominent factor in the lymphatic involvement. Another, the one with the early hemorrhage from the nose and mouth, can also probably be brought in this same class. No remarks are made as to whether the blood came from the lungs, but often hemorrhage is one of the first symptoms of pulmonary tuberculosis regardless of signs.

Sailer diagnosed these cases as lymphatic tuberculosis, but compares them to pseudoleukemia and states later in his paper that there are "three forms of disease of the lymph nodes that may give rise to the syndrome characteristic of pseudoleukemia. These are lymphosarcomatosis, tuberculosis, and a peculiar infectious process, whose cause has not yet been discovered, but which, by some (Reed), is regarded as the only true form of Hodgkin's disease." Sailer believes that there have not as yet been a sufficient number of these cases carefully worked out to prove conclusively the existence of Hodgkin's disease. Postmortem notes in Sailer's cases are as follows:—In his first case he reports miliary tuberculosis of lungs and liver, and tubercular ulcers of intestines. He makes no reports about the lymph nodes. In the second case the lungs showed miliary tuberculosis, there was tuberculosis of spleen and liver; the gastrohepatic and retroperitoneal lymph nodes were greatly enlarged and caseous; there was also tuberculosis of prostate, supposedly the initial lesion. No tubercle bacilli were found. In the third case there was a miliary tuberculosis of the lungs, tuberculosis of the lymphatics and spleen, in fact, of all organs. In the fourth case tuberculosis of lungs and spleen, tuberculous ulcers of intestines; the mesenteric and mediastinal lymph nodes were slightly enlarged. No tubercle bacilli were found, but inoculation in guinea pigs produced general tuberculosis.

Sternberg in a paper in 1898 reports 15 cases resembling pseudoleukemia and states positively that they are all tubercular. In these cases no inoculation experiments or cultures were made. In 6 of the 15 cases the bacillus was found in some organs. In commenting on this paper Sailer says:—"It is only from the fact that this work confirms the results obtained by other men who have made careful examinations of the lymph nodes in cases of pseudoleukemia that we are justified in considering it an established contention that in a large proportion of the cases supposed to be pseudoleukemia the tubercle bacillus is present, either as a causative or an associated factor." And he ends his paper by stating

that "the absence of entirely satisfactory evidence rather tends to confirm the supposition that the majority of cases of pseudo-leukemia, if not all, will ultimately be recognized as tuberculous in nature."

On the other hand Dorothy M. Reed, in a very able paper in the Johns Hopkins Hospital Reports, "On the Pathological Changes in Hodgkin's Disease with Special Reference to its Relation to Tuberculosis," takes the positive stand that Hodgkin's disease is a special glandular disease; that while many cases, which are supposed to be Hodgkin's disease, are really tuberculous, some are not tuberculous; that the causative factor is some unknown substance which produces definite histological changes, and these changes are so constant as to be pathognomonic. I quote from her paper. "We believe, then, from the descriptions in literature and the findings in 8 cases examined, that Hodgkin's disease has a peculiar and typical histological picture, consisting of proliferations of the endothelial and reticular cells, formation of lymphoid cells, and characteristic giant cells, and a gradual increase of connective tissue, resulting in a fibrosis, and, in most of the specimens, in the presence of a great number of eosinophiles."

In her conclusions she states:—"First, we should limit the term, Hodgkin's disease, to designate a clinical and pathological entity, the main features of which are painless, progressive glandular enlargements, usually starting in the cervical region, without the blood changes of leukemia. Second, the growth presents a specific histological picture, not a simple hyperplasia, but changes suggesting chronic inflammatory process. Third, the microscopical examination is sufficient for the diagnosis. Animal inoculation may confirm the decision by its negative results. Fourth, eosinophiles are usually present in great numbers in such growths, but not invariably. Their presence strengthens the diagnosis. Fifth, the pathological agent is as yet undiscovered. Tuberculosis has no direct relation to the subject."

We are endeavoring to add our quota to the evidence that Hodgkin's disease is an entity; that the case we report is not a tuberculous adenitis, as is proved both from the clinical history and by the fact that the tubercle bacillus was not found in the lymph nodes, even by the inoculation tests, either from nodes removed by operation from the cervical regions, in March, 1901, or from nodes taken at the autopsy in May, 1902; that it is not

sarcoma, as shown by histological examination; that it is not syphilitic, as is proved by the clinical course of the enlarged nodes, the absence of syphilitic family taint, and the failure to react to Justi's test; and that in its histological characteristics it conforms to the most recently adopted views of that disease.

M. G., aged 9 years, was admitted to the Children's Hospital in August, 1898. Her family history was negative, except that her father's mother died at eighty of cancer of the stomach. The other grandparents are over seventy-five and well, except a grandfather about whom they know nothing. There is no family history of tuberculosis; no known exposure to tuberculosis, nothing like this in the family; and no syphilitic history. She was breast-fed until eleven months old, when she burned her mouth with lye, and was fed on sperm oil and milk till her mouth healed. As an infant she had a ventral hernia, which corrected itself, and she was always well, until five years old, when she had a mild attack of typhoid fever of three weeks' duration, recovering entirely. Eight to ten months later, when six years old, she is said to have caught cold and the lymph nodes in the neck commenced to grow. At seven she had a mild attack of measles which did not seem to increase the size of nodes. At eight Dr. I. W. Potter removed six tumors from neck, which had started from under the back of the ear and had grown toward the front. These lymph nodes had existed about two years, were all of one size, and had never shown any tendency to break down. In five or six months after operation they grew faster than ever.

Upon admission she had a mass of lymph nodes, about the size of a large orange, in the left cervical region, mostly in the anterior triangle, not involving the submaxillary nodes, and not adherent to the skin. The mass was not hard, was nodular, somewhat movable and painless. Dr. Parmenter declined to operate. She was put on mercauro for about six months, and then on arsenic, which was kept up more or less continuously for a year. During the course of arsenic treatment the lymph nodes decreased so that the circumference of the neck was one inch less, but later the mass started to grow again and before she left was pendant over the left clavicle. The superficial veins over the mass were much dilated, but the character of the mass did not change, except in size. I can find no record of a blood examination at that time. No mediastinal mass was recognized, and nothing abnormal was found in any other organ. The only marked

symptom was an increasing anemia. There was nothing unusual about her temperature, pulse or respiratory record.

In March, 1901, she was operated upon in the Buffalo General Hospital, by Dr. Roswell Park, assisted by Dr. Gaylord, and the whole mass removed. (Fig. I.) From Dr. Park's notes I quote



FIG. I.—M. G., AGED 11.

the following. "A long, S-shaped incision from mastoid down to clavicle was made. Through this it was possible to enucleate the mass, mainly in one portion, which mass consisted of enormously hypertrophied lymph nodes, each in a capsule, from which most of them were easily enucleated. They extended down behind the clavicle and sternum into the thoracic cavity, and, after enucleating the mass from behind the clavicle, the upper surfaces of the pleura were exposed. These were exceedingly adherent all along the sheaths of the great vessels, which, however, were not exposed in such a way as to demand ligature. A number of veins and a few arteries required to be ligated, after which the incision was closed, with posterior opening for drainage. Patient stood

the operation very well." She did well for about six months, when she began to fail, became paler and somewhat edematous both in legs and abdomen.

Upon admission again to the Buffalo General Hospital on November 5, 1901, she was feeling very weak, had some temperature and a slight cough. We quote from our notes the following as to

her physical condition a short time after her return and nearly one year after last operation. The child is pale and thin, with cervical lymph nodes on right side somewhat swollen, but not to any extent on left side at the site of operation. One is prominent on left side at about the junction of clavicle and sternum. From right axilla and extending up and over pectorals the nodes are decidedly enlarged, about size of half a small fist. On left side in same position one node is enlarged, about the size of a white grape. In the right groin is a bunch of three nodes a little smaller than grapes. In the left groin the same, but a little smaller. No epitrochlear enlargement. All these nodes were of same character as those of the neck at the time of admission to the Children's Hospital about two years before and had never shown any tendency to break down.

Examination of the chest showed the superficial veins distended, especially of the upper part in middle and to left of sternum. There was some dyspnea. In the anterior mediastinum signs pointed to a mass probably not in left lung, but supposed to be the cause of dyspnea. Anteriorly, on left side, motion was impaired. The suprasternal notch and xiphoid cartilage were depressed on inspiration. Percussion on the left side was impaired, even to flatness at third interspace. Tactile fremitus absent. The right side was nearly normal on inspection, palpation and percussion. In the left lung in the supra- and infra-clavicular regions there was almost bronchial breathing, thought to be due to atelectasis. In the left axilla the breathing was impaired, and there was a friction rub.

In the right lung the breathing was puerile with prolonged and sibilant expiration. Posteriorly, the left lung was similar to the front, except at base where were signs of consolidation, thought to be partially due to fluid. The right lung was the same as in front. The heart was slightly displaced to the left but otherwise normal. The abdomen was distended, possibly a slight amount of fluid; liver enlarged, measuring seven inches in anterior axillary line; no tenderness. In median line three inches above navel there was a small nodular mass, which became tender after frequent examinations. In lower part of abdomen the tympanitic note was impaired in an irregular line; spleen enlarged, not sensitive.

The cough mentioned as being present upon admission, persisted. The sputum was at first wanting, then scant, and was

repeatedly examined for the tubercle bacillus, which was not found till February 8, 1902, when the sputum had become very slightly mucopurulent. From that time on they were present. Staphylococci were always present and streptococci and a few diplococci were found. The expectoration was never very profuse and seemed for a long time to yield to arsenic, which was crowded to its therapeutic limit for two months, the drug being taken for a time in dosage as high as 30 drops of Fowler's solution in a day. The arsenic did not seem to benefit her in any other way except, possibly, her weight, which increased a few pounds; there was no effect on the blood.

During her last stay at the hospital, from November till her death in May, she had an irregular temperature, sometimes dependent upon an exacerbation of her lung condition and sometimes without apparent cause, but at no time were the febrile periods so distinctly marked in periods as Musser has described seeing in a series of cases, where there would be fever for ten, twelve or eighteen days and afebrile periods of similar lengths of time. Our case had afebrile periods, but they were of indefinite duration. Examination of the blood gave the following:—November 3d, erythrocytes 4,095,000; leukocytes 11,135. March 28th, specific gravity 1.050; hemoglobin 65 per cent.; erythrocytes 4,900,000; leukocytes 16,632. April 11th, specific gravity 1.045; hemoglobin 45 per cent.; erythrocytes 4,800,000; leukocytes 13,490.

A leukocytosis of any extent did not appear till some time after the sputum had shown tuberculous involvement. Very unfortunately some of the slips of blood examinations have been lost and we are not able to give the actual figures of the differential counts, but we distinctly remember that there was nothing remarkable about them. No nucleated red corpuscles were found. In these statements we have the support of the resident physicians who made the examinations.

The urinary analyses showed the specific gravity running from 1.015 to 1.030, averaging about 1.025. The amount of urine was persistently decreased, amounting to from 500 to 800 cc. Albumin was found in very small amount during her stay in the hospital, and once casts of a granular type were reported, but at no other time were any found. No sugar was found. Indican was reported merely as present.

At later examinations the lymph nodes, especially of the

axillæ, increased in size. The mass in the abdomen increased most rapidly, was somewhat sensitive, and fluid in large amount appeared. There was some slight edema of lower extremities. The sputum became more abundant, and after a while mucopurulent, and seemed to come from near the mediastinal mass where numerous moist râles now appeared. Near the end the child failed rapidly, general anasarca developing.

Record of Autopsy, by Dr. H. U. Williams.

Mary Gothard, aged fourteen, born in Buffalo. Died May 9, 1902. Nutrition, poor. Rigor mortis, moderate. Lividity, fairly well marked. Three scars left side of neck. Edema of left leg greater than right. Cervical, axillary and inguinal lymph nodes enlarged.

Pleural Cavities.—Large amount light yellow fluid. Left lung, atelectatic, adherent at base and inner aspect. Mass of solidification in lower half of upper lobe; consolidated bluish white areas, partly necrotic in upper lobe; exudate pus. Lower lobe has mass growing from root of lung, size of an egg. Right lung, free. Around bifurcation of trachea a mass, firm, yellowish white, mottled with small yellow necrotic areas. Mediastinal lymph nodes much enlarged. Bronchial lymph nodes enlarged.

Peritoneum.—Large quantity light yellow fluid and a little fibrin in cavity. Along spine below diaphragm enormous masses of lymph nodes or tumor, consisting of more or less separate nodules, in the aggregate equal to five or six oranges. Hard, yellowish white on section, with some apparently necrotic areas.

Spleen has masses of same substance growing into it at the hilum. Is also mottled with hard yellowish white areas of 5-10 mm. diameter. Enlargement of mesenteric nodes. Diaphragm—seventh rib on right, sixth space on left. Heart—muscle firm, a little pale, otherwise normal. Vessels—superficial veins on shoulder and chest enlarged. Urinary organs not remarkable. Stomach, etc., not remarkable. Liver two to four inches below ribs. Weight 3 lbs. 1 oz. Soft and mottled. Gall bladder small and empty; contracted.

Anatomical Diagnosis.—Universal lymphosarcoma. Ascites and hydrothorax. Bronchopneumonia, upper lobe, left lung. Right lung atelectatic from pressure. Fatty liver.

Histological description of lymph nodes removed March, 1901, from case M. G. A lymph node about the size of a cherry and one somewhat smaller were chosen for section. An ordinary

section stained with hematoxylineosin shows that the lymph node has lost its characteristic structure. There are no lymph follicles except in a narrow compressed portion beneath the thickened capsule. The characteristic lymph channels throughout the node, except in the region mentioned, have disappeared. The entire

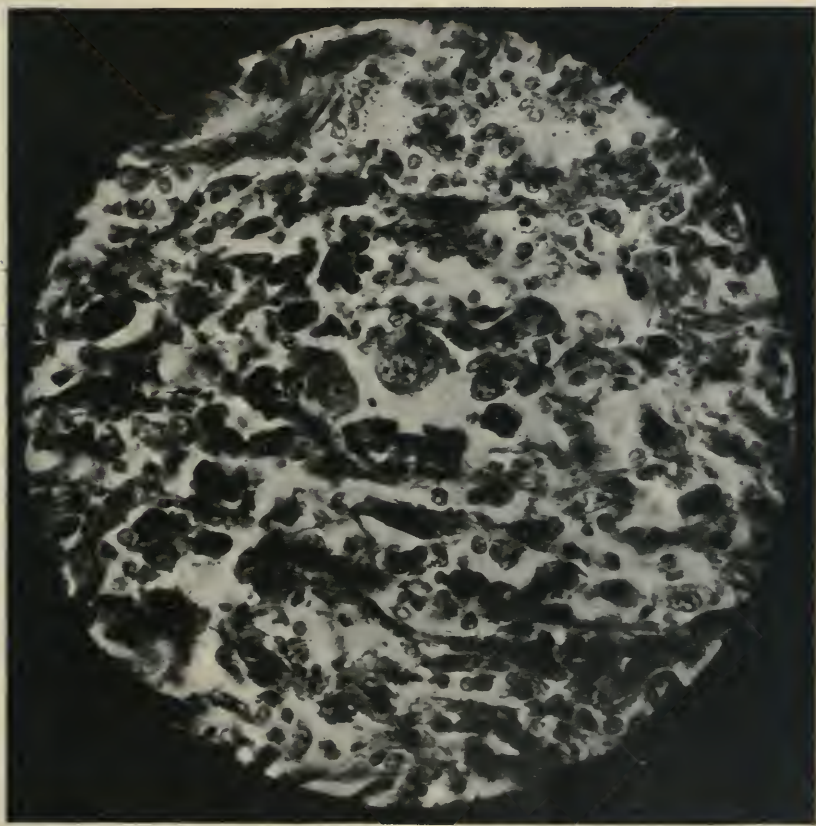


FIG. II.—LYMPH NODE SHOWING HYALINE STROMA (HEMATOXYLINEOSIN, MIDDLE POWER) AT THE CENTRE ENDOTHELIAL GIANT CELLS.

node possesses a much thickened stroma composed of bands of connective tissue which in the central portion have undergone hyaline degeneration. The blood vessels in the lymphatic structure are enlarged with thickened walls. The structure of the lymph node is composed of spindle connective tissue cells with

here and there groups of round cells, especially about the periphery of the node and in the best preserved portion beneath the capsule already mentioned. Two or three areas near the centre of the node show evidence of necrosis, no nuclei are demonstrable and the connective tissue structure appears hyaline.

Under high power the lymph node is found to have undergone a marked hyperplasia in which the elements no longer retain the characteristic structure of a lymph node. The node is composed of spindle connective tissue cells, scattered between which are a few lymphocytes and a considerable number of large endothelial giant cells with multiple nuclei. Here and there a remnant of a lymph follicle can be detected in a group of lymphocytes about a vessel. These are extremely rare. (Fig. II.)

A section stained with polychrome methylene blue shows the presence of a considerable number of typical plasma cells located usually in the neighborhood of the vessels and about the periphery of the node. The giant cells which are so frequent through the structure of the node are well differentiated by this method and can be more closely studied. They are large cells possessing one or more nuclei; as many as six or eight nuclei are not infrequently present. The nuclear membrane is sharply defined from the protoplasm of the cell which takes on a rose tint with the polychrome methylene blue. The nucleoli are frequently a distinct rose-violet, whereas the nuclear membrane is sharply defined and deep blue. Occasional typical foreign body giant cells are likewise present. In these latter the nuclei are frequently arranged about the periphery of the cell.

An examination for eosinophiles in sections stained with Ehrlich's triacid stain yields positive results. About the periphery of the node are extensive accumulations of these cells. They are readily recognized by the bright, highly refractive, orange granules which this protoplasm contains. The nuclei of the eosinophiles are pale green. They are so frequent in many places that as many as eight or ten can be counted in an oil immersion field. (Fig. III.)

A section stained with iron hematoxylin and Bordeaux red fails to show the presence of any inclusions whatsoever. Nothing is encountered which might be interpreted as possible parasites.

As a result of the histological examination above given the diagnosis of malignant lymphoma or Hodgkin's disease was made.

Macerated portions of the lymph nodes were injected into the ear vein and abdominal cavity of a rabbit, weighing 1,580 grams, on March 19, 1901. The rabbit showed no reaction from these injections and rapidly lost weight until May 15th, when it died weighing 1,010 grams. A careful examination of all the organs and viscera of this animal failed to show the presence of tuberculosis or other pathological changes which can be viewed as

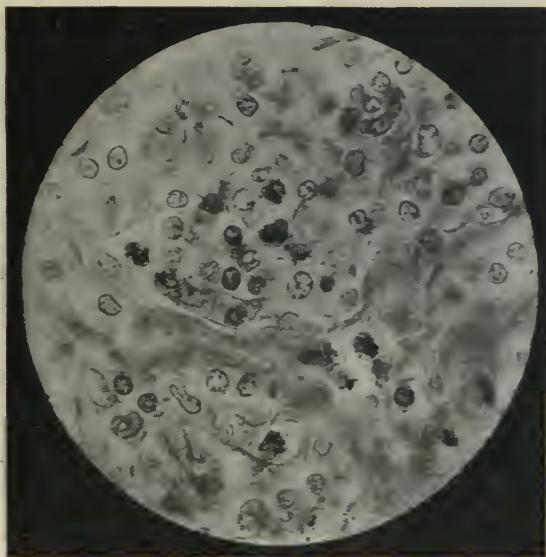


FIG. III.—LYMPH NODE (EHRlich TRIACID STAIN, OIL IMMERSION). GROUPS OF EOSINO-
PHILES (GRANULES BLACK IN ILLUSTRATION, ORANGE IN SECTION).

characteristic. Sections of certain enlarged lymph nodes which were stained for tubercle bacilli failed to demonstrate them.

Material was obtained from the autopsy May 9, 1902, which consisted of large packs of lymph nodes, many of which, on section, showed extensive areas of necrosis and from which the smaller lymph nodes were chosen for section. An examination of the smallest nodes showed a hyperplasia of the lymph node with large numbers of lymphocytes. Somewhat larger lymph nodes presented exactly the histological characteristics described in those obtained by operation a year before. Fragments of

lymph nodes taken from various portions of a mass removed from the retroperitoneal region were introduced into the abdominal cavity of a guinea-pig May 9th. This animal died on May 19th without evidence of tuberculosis. Inasmuch as the time was unfortunately short examination was made of a fragment of implanted lymph node which was found in the abdominal cavity. On section the structure of the implanted lymph node is plainly

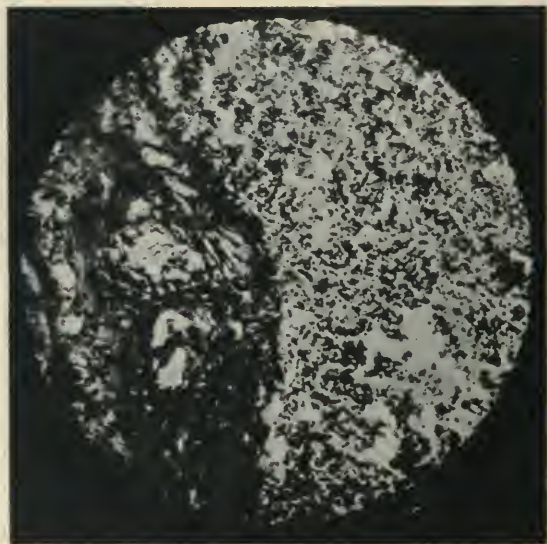


FIG. IV.—LYMPH NODE FROM AUTOPSY IMPLANTED IN GUINEA-PIG (HEMATOXYLIN, LOW POWER). TO THE RIGHT LYMPHATIC STRUCTURE, TO THE LEFT ORGANIZING CONNECTIVE TISSUE.

discernible. The stroma and vessel walls are well defined. The cellular elements of the node are composed for the greater part of lymphocytes with here and there a giant-cell. About the margin it is seen that the lymph node is surrounded by a thick capsule of connective tissue derived from the subperitoneal connective tissue of the guinea-pig. Fibroblasts are found penetrating into the margins of the lymph node and nowhere is any evidence of tuberculosis. Sections stained for bacteria fail to show the presence of any organisms. We therefore assume that the mass introduced was sterile at the time of introduction. (Fig. IV.)

It will be seen on reviewing these facts that our case conforms perfectly to the standard suggested by Reed and that it is one of uncomplicated Hodgkin's disease and strongly sustains her belief that Hodgkin's disease is a distinct process. Tubercle bacilli were absent from the enlarged nodes at all times, as proved by inoculation experiments at the time of operation and one year later at the autopsy. In the light of our findings in this case we are heartily in accord with Reed and believe that our case is one of true Hodgkin's disease according to her interpretation.

Juvenile Tabes.—Marburg (*Wien. Klinische Wochenschrift*, XVI., No. 46) reports a case of tabes in a boy of ten who had acquired syphilis in infancy from a nurse. He also tabulates 34 other cases under the age of twenty-one which he has found in the literature. He remarks that all the symptoms observed in tabes in an adult are encountered likewise in infantile and juvenile tabes, the only difference being in their relative frequency or rarity. Syphilis was positive in all but 4, and in these was probable. It was acquired in 2, but in all the others had been inherited. The coincidence or succession of several infectious diseases, scarlet fever, diphtheria and measles after pertussis, or an injury to the head, seem to favor the development of tabes in children with a hereditary burden. In some of the cases an inherited predisposition to nervous affection was noticed; in others the onset of puberty apparently favored the outbreak of the tabes. Lancinating pains were noted in 21, girdle sensations in only 4, and initial headaches in 5 out of the total 35. Sensory anomalies were noticed in two-thirds of the patients, and Romberg's sign in three-fourths, as also bladder disturbances. In 12 there was total atrophy of the optic nerve or beginning blanching of the papillæ. In only a single instance were there no objective optic findings. In his experience, the development of the optic atrophy coincided with an arrest or improvement of the tabes. In his own ophthalmic service during the last nine months he has met with 55 cases of genuine optic atrophy, including 22 tabetics. Only 12 of these presented evidences of antecedent syphilis, and the interval since infection ranged from sixty to forty years, sixteen years in 3 cases. Only 7 of these 22 tabetic subjects presented the Romberg sign and there was no ataxia in any. In some, the tabes had been always mild since its inception twenty to twenty-five years before, confirming the experience of others in regard to the mildness of the cases in which optic atrophy is a prominent symptom at any time in their course.—*Jour. Am. Med. Assn.*

CHOREA MINOR. CLINICAL AND THERAPEUTIC DATA.*

BY HENRY W. BERG, M.D.,

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The term chorea, from the Greek *χορεία*, a dance, is a designation applied to various affections of the nervous system which must be sharply differentiated. The ordinary form of chorea which we see in daily practice, affecting for the most part children from five to fifteen years of age, is chorea minor, Sydenham's chorea, St. Vitus' dance. Chorea major or magna is a choreiform affection complicating hysteria, characterized by violent rhythmical movements, and is not true chorea. Some older authorities, however, apply the term chorea major to cases of St. Vitus' dance, in which the whole body is involved in violent choreiform jactitations, the patient being thrown about as if by some external force so that neither a sitting, standing nor recumbent posture can be maintained during the waking hours of the patient's existence. These violent cases are real cases of St. Vitus' dance of great severity and are of more serious prognostic import, for these are the cases which occasionally result fatally.

Huntingdon's chorea or hereditary chorea, a very rare form of chorea, while it resembles chorea minor in its motor manifestations, has nothing else in common with St. Vitus' dance. It is a disease of middle life, chronic and progressive in character, with a distinct hereditary history of similar affections in the direct ancestors of the patient, terminating usually after years of duration in paralysis and death. Although this hereditary history is a diagnostic factor in Huntingdon's chorea, a neurotic family history is very common even in ordinary cases of chorea minor.

True, chorea minor is a disease of child life. In my experience, in the clinic of Dr. E. C. Seguin at the College of Physicians and Surgeons, with which I was connected years ago as assistant in charge of the children's class for nervous diseases, as well as in the not inconsiderable number of cases in my private practice, I have seen the disease most frequently in girls between the ages of five and fifteen years. Nevertheless, the affection

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is quite common in boys. The children are generally weak, pale and anemic, and ill-nourished. They are mentally either brighter or duller than is normal for children of a similar age. I have seen several cases of chorea minor affecting children below five years of age, but I have never seen a case of congenital true chorea minor, although such cases have been reported, as well as cases of true chorea in infants from two weeks to six months of age. I am disposed to believe that such cases as these are not true cases of St. Vitus' dance. We all are familiar with the constant twitching and restless movements of all the extremities, voluntary and involuntary muscles, which characterize the newly-born as well as very young children, owing to the fact that the inhibitory cerebral centres are still comparatively inactive, and it would be easy to mistake a more than normal motor excitability of the extremities and facial and other body muscles for chorea. Such cases we all have seen, and while I do not deny the existence of congenital chorea when accompanying grave cerebral lesions, such as hydrocephalus, cerebral spastic paraplegia or hemiplegia or monoplegias due to cortical or central lesions, these are not cases of chorea minor, but post paralytic chorea, comparable to the athetoid movements described by Hammond. Chorea is very apt to affect young girls at the beginning of the menstrual period, and occurs rather rarely in middle life, but is not infrequent in old age (*chorea senilis*). The chorea of adults is apt to be a complication in various types of insane conditions; when it occurs it is most common with dementia, occasionally with mania. Senile chorea frequently complicates senile dementia.

I must not neglect to mention chorea of pregnant women. For in this condition chorea is an extremely grave manifestation. It is apt to complicate first pregnancies. It is partly hysterical in its causation in these cases, possibly also reflex. I am led to attach more importance to the former etiological factor, because chorea gravidarum is found especially frequent in young girls who have become pregnant without the formality of marriage. The disease manifests itself early in the pregnancy. A case occurring in my own practice was a young girl of eighteen, whose mother brought her to me to be treated for St. Vitus' dance, and who had missed two menstrual periods, having previously menstruated regularly. A physical examination revealed a pregnancy of about the third month. The prognosis in these cases is much graver than is usual in chorea minor. The choreiform twitchings

become more violent as the weeks pass. The patient is disturbed from her sleep, loses appetite, develops fever, and sometimes albuminuria and occasionally the chorea of pregnancy terminates in spontaneous miscarriage, or an artificial miscarriage becomes compulsory to prevent a fatal termination. In some cases the chorea lasts until the child is born at term. In many it ceases spontaneously. In all the chorea ceases when the uterus has discharged its contents.

A very common etiological factor in the chorea of children is fright. Nervous children are very liable to develop an attack of chorea, especially if there are other predisposing factors present, through fright. The causes of such fright may not have been very terrifying. Thus a child forced to enter a dark room may emerge therefrom with a commencing chorea. A merited scolding or chastisement by the parent may have a similar result. The hearing of a gruesome story, the witnessing of a terrifying scene in the theatre, any of the multitude of things or occurrences that frighten children may result either immediately or a few days later in chorea. Even a frightful dream and attack of night terrors may have a similar result. Even in cases in which an undoubted pathological etiological factor for the chorea exists, a fright may be the immediate precursor of the attack. Worry and mental excitement bear the same relation to an attack of chorea in adults that fright does to an attack of chorea in children. Thus, overstudy at school and college preparative for an examination, written or oral, all of these are important factors in the causation of chorea minor in older children and young adults. Children may simulate the actions and behavior of other children whom they have seen suffering from St. Vitus' dance. This is imitative chorea. Epidemics of this affection have occurred in schools and asylums. This form of chorea, which might be termed mimetic chorea, I do not consider a true chorea minor. It is a neuromimetic quasi hysterical manifestation and one that can readily be distinguished from true chorea minor. When the little patient's attention is artfully distracted it will be found that the irregular muscular twitchings are suspended. When the child is watched at play, unconscious of being observed, the jerking and jactitations are not present. The contrary is true in an attack of ordinary chorea. Such mimetic cases are frequently cured without medical aid by parents who do not believe in sparing the rod. Unfortunately this favorable result

from harsh measures sometimes leads to their employment in cases of true chorea minor with disastrous results. For terror and fright invariably increase the severity of attacks of real St. Vitus' dance. Neurotic children are more liable to attacks of chorea than others, and it is apt to be a disease of civilization. Thus negroes in the warm climates never suffer from chorea, while Jewish children, on the other hand, are very frequently subjects of it. Anemia is frequently assigned as a cause of chorea, and I have rarely met with cases of chorea in which a simple anemia (diminished hemoglobin and red cell count) was not a factor in the clinical picture. Chlorosis, too, is frequently present in young girls suffering from St. Vitus' dance. It was customary formerly to ascribe malaria as a cause in many cases, but that was in the days when the microscope was not a factor in the diagnosis of malaria. Intestinal autointoxication has been a factor in the pathogenesis of this as in that of other functional nervous diseases. Its importance lies in the clues which it offers for treatment in cases in which it is looked upon as a cause. I have repeatedly seen chorea minor develop in cases of chronic disease in children. Thus one case of hip-joint disease in which chorea developed either as a reflex manifestation from the hip-joint disease or from the secondary anemia. Some years ago excessive importance was attached, by an ophthalmologist of this city, to errors of refraction and difficulties of accommodation affecting the eyes as causing a reflex chorea. As a result he performed many operations for strabismus and fitted many glasses in the attempt to prevent the development of a commencing attack of chorea or to cure an existing one. At present such reflex etiological factors, while not entirely negatived in the causation of chorea, have lost much of their old time importance in the opinion of clinicians.

We may pass over a multitude of other less important causes, such as helminthiasis, gastroenteritis, etc., to discuss a group of pathogenetic factors in this disease which I have purposely left to the last, because their importance is by far greater than all the other etiological and pathogenetic factors in the understanding of this mysterious disease. These factors include the solution of the relationship between rheumatism and the various heart lesions, myocarditis, endocarditis and pericarditis, and true chorea. An attack of chorea minor when accompanying rheumatism may occur either before an attack of rheumatism, during an attack or after an attack. A patient suffering from chorea minor may have

endocardial disease or a murmur may develop while the St. Vitus' dance is in progress, the patient having suffered only from myocarditis or irregularity of the heart's action when coming under observation for the chorea. As to the percentage of cases of St. Vitus' dance in which rheumatism or cardiac lesions are thus present I am not in a position to give absolute figures in my cases, but I believe that not more than half the cases have suffered from such a complication. I have at present 2 cases under my care in both of whom there is neither rheumatism nor a cardiac lesion. It must not be forgotten, however, that rheumatism may show itself in some of these cases by only slight joint pains, and no fever. The parents call these pains in these young children growing pains, which in reality are cases of mild rheumatic arthritis. In a little girl whom I treated for several recurrent attacks of chorea, and who suffered also from frequent attacks of inflammatory rheumatism, and was also the subject of a mitral regurgitation, the rheumatic attacks, and the choreic attacks were always independent of each other so that I was led to believe that the chorea replaced what would otherwise have been an attack of rheumatism. So frequently, however, are rheumatism and rheumatic complications a factor in the causation of chorea that it is not surprising that the little that we know of the pathology of chorea points directly to rheumatism and cardiac lesions as an important factor. Embolic processes in the terminal capillaries of the small branches of the middle cerebral arteries, particularly on the left side of the brain, have been located, the emboli being most frequently present in the corpus striatum. Meynert found degeneration of the cortical cells of the motor area, and even of the third frontal convolution possibly secondary to emboli. Although such pathological findings have not been frequent, chorea minor causing death very rarely, they are sufficient to fix the location of the lesion if not its character. It is evident that where the conditions for the production of emboli do not exist in the heart, an embolic lesion can not be the pathological cause of the disease. In such cases, however, the same pathogenic cause that accounts for the rheumatism may account for the chorea. It is not surprising, therefore, that Pianese found a diplococcus, pure cultures of which when injected in animals produced choreiform affections. Whether this organism bears any relation to or is identical with the streptococcus supposed to be one of the pathogenic factors in rheumatism is un-

certain. It is interesting in this connection to remember that a precedent scarlet fever is a comparatively common factor in the past history of choreic patients. Such germs may cause infarcts similar to those found with multiple minute emboli due to heart lesions. They may furthermore produce a toxic endarteritis resulting in minute hemorrhages in the motor cortical areas and the corpus striatum. Or, finally, a cerebral toxemia dependent upon these infectious causes might result in similar choreiform manifestations due to irritation or malnutrition of the same brain centres. As you know, much of this is problematical and the subject is still a fruitful field for extensive investigation.

While I do not wish to describe the symptomatology of an ordinary case of chorea, some interesting features in the purely clinical manifestations may be mentioned. First, hemichorea, and preferably right hemichorea, is far more common than general chorea. One arm and one leg are either alone involved or involved to a greater extent than the other side. In severe cases of chorea minor the irregular non-rhythmical twitchings are quite general, the arms, legs, shoulders, back, trunk, face, lips, nose, forehead, eyelids, neck and even the muscles of articulation are involved. Sometimes the attack in its early manifestations is pseudo-paralytic rather than convulsive and a very careful examination is required before one observes the irregular twitchings of the muscular fibres of the face or arm, which confirm the suspicion of the presence of chorea minor. That there is a weakness of the affected limb or limbs in every case is readily seen when the patient drops articles like cups and saucers and other utensils. Some of this disability is undoubtedly due to the twitchings and incoordination. There is, however, marked diminution in the grasping power of the hand, dragging of the leg in walking and sometimes even inability to stand; the severely affected patient drops upon a couch, the twitchings continuing and preventing the maintenance of even the recumbent posture in severe cases. The degree with which the patients are affected varies, some of the cases being very slight, the disease showing itself only by slight grimaces and slight twitchings of the limbs, while others are in constant, irregular, violent motion, unable to utter an articulate word, scarcely able to swallow, while incontinence of urine renders the misery of the little patient more marked. And yet even in these severe cases the prognosis is not bad under appropriate treatment. Occasional-

ly, however, fatal cases occur even in children, while in adults the prognosis of severe cases of chorea is very much more grave. Children that recover from chorea minor are all subject to a return of the condition sooner or later. The interval between attacks is generally about a year. A large number of these cases relapse, and I have treated some cases three or four times. Frequently children are met with in whom the first attack subsides, but the disease never entirely disappears. In such patients a careful examination will reveal slight occasional twitchings, which at long intervals increase, and a new attack is thus initiated. Localized choreas, especially such as involve the eyelids (blepharospasm), the face, and shoulders, are truly choreiform and are apt to persist for long periods, sometimes for life. The tongue is affected in almost every case. This can readily be observed by letting the patient protrude the tongue. Much of the difficulty in speech is due to this involvement of the glossal muscles. The extrinsic muscles of the eyeballs are also involved, as are those of the soft palate and pillars of the fauces. Purposed and voluntary movements increase the choreiform twitchings, which serves to distinguish true chorea from hysterical chorea in children and adults, and from paralysis agitans in adults. The diaphragm and other muscles of respiration seem to be affected, for in severe cases the respirations are increased in frequency and irregular. The deep reflexes are never affected. The rectal sphincter is never involved. There is much difference of opinion as to the real mental condition of patients suffering from severe chorea minor. Some authorities believe that the dementia, which is present in these cases, represents a real condition of mental degeneration. Others, on the other hand, claim that the ridiculous postures into which the disease throws the patient, the peculiar noises to which he gives utterance, the inability to speak, so mortify even a child that it takes refuge in an assumed indifference to its surroundings, refuses to speak for weeks at a time, and devotes its whole energy to obtaining as much peace and rest as the disease will permit. There is no doubt that considerable mental strain and preoccupation accompany the constant efforts necessary to coordinate, and to perform ordinary movements, but I have not yet been able to convince myself of the presence of any real organic dementia, melancholia or mania in a case of essential chorea. The examination of the urine of chorea cases reveals some points of interest; it is generally increased in quantity, of high specific gravity and

contains a large amount of phosphates and urates. Sugar is sometimes found in very violent cases. The presence of albumin is not exceptional in children suffering from cardiac diseases, and when found in such cases in which chorea is a factor, the albumin and casts must be ascribed to a kidney lesion, secondary to the cardiac disease, and not to the chorea. The chorea of pregnancy, however, is frequently accompanied by albumin in the urine and this forms an important symptom in this condition, being a factor in the determination of the necessity of an artificially induced miscarriage.

The limits of this paper do not permit an exhaustive discussion of this subject, but some remarks as to treatment will not be amiss.

Principles of therapy here as in other diseases require that when an etiological factor which is amenable to treatment exists that factor should be recognized and remedied. As is well-known we now class rheumatism among the infectious diseases, and the source of infection seems to be in the tonsils and nasopharynx. In cases of chorea that have a rheumatic history the throat and nasopharynx should be carefully explored; if adenoids are found they should be removed, and chronically enlarged tonsils should be ablated and treated. The bowels and stomach should be put in the best possible condition, and if worms are found in the stools anthelmintics should be given. The anemia present in almost all of these cases should be treated with appropriate iron preparations. The diet should be readily digestible, should contain very little meats, but should be rich in fats and carbohydrates, the latter to be excluded, however, in those severe and rare cases in which sugar appears in the urine. The child should be put to bed in a quiet and darkened room for several hours in the afternoon and encouraged to sleep. It is absolutely necessary to keep such children at home from school, for even in the milder cases the surroundings and duties of the schoolroom are not conducive to the recovery of the patients. Most of these children sleep fairly well at night. The severe cases, however, do not, and hypnotics will sometimes be necessary. Such drugs as do not affect the heart are to be preferred for this purpose. I have recently used in children from two to five years old single or more grain doses of veronal with fairly uniform results. As far as the special drugs for the chorea are concerned in those cases in which there is a rheumatic and cardiac element, I place first the administration of

the salicylate of soda. I use this drug in these cases, as I would use it in subacute and chronic rheumatism, in moderate doses given every five hours, and sufficient to produce a slight ringing in the ears. A subsequent dose is not to be given as long as the tinnitus lasts. In one of my cases in which marked chorea minor attacks alternated with attacks of rheumatic arthritis, the salicylates were equally efficacious in cutting short the attacks of chorea as well as the attacks of the rheumatism. I would recommend that in all cases in addition to the other remedies used the salicylates be given, and I am sure that in many cases with marked benefit, in some with wonderful curative effect.

The arsenic treatment of chorea is classical. I can only say that in my experience cases treated with this remedy up to physiological tolerance have recovered in from two to three months and have remained well until they have had a relapse. I generally give Fowler's solution, beginning with one or more drops, according to age, and increasing the dose every third day until slight swelling of the eyelids is present in the morning. The arsenic should be given in water or vichy after meals. The gastric effect should be carefully watched, and other signs of the physiological effects looked for, such as nausea, pain in the throat, skin eruptions, etc. The appearance of such symptoms means a diminution or suspension of the drug. Especially careful should the physician be to examine the urine daily at least for albumin, and if this appears as a result of the arsenic administration the arsenic must be suspended immediately.

I have never used strychnin either by injections or by the mouth in the treatment of chorea. I have never given chloroform to diminish the violence of the spasms. I do not think that the anesthetics are indicated, and yet they have been advised by eminent authorities.

In every case tonic treatment should be used. This means principally iron and stomachic tonics. I must not forget in conclusion to remind you that in cases of endocarditis with chronic heart changes the treatment of these with the usual cardiac stimulants, such as digitalis, strophanthus, nitroglycerin and other well-known remedies, forms a necessary part of the therapy.

HEMORRHAGE OF SYPHILITIC ORIGIN IN THE NEWBORN.*

BY W. REYNOLDS WILSON, M.D.,

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The existence in the newborn of a tendency to leakage from the blood-vessels in the presence of abnormal conditions is a matter of common observation. The blood at this period is the most unstable of all the tissues, probably from the fact that it is undergoing the transition that marks its change from fetal to mature blood. The extravasations which are common in the neonatal period depend upon developmental conditions, as hemorrhages of this character are not manifest at birth, except as the result of trauma, and cease to be observed after the first few weeks of life. This is corroborated by the fact that prematurity and conditions of subdevelopment predispose to such hemorrhages.

Without disregarding other causes it has been demonstrated that certain hemorrhagic conditions are the accompaniment in the newborn of the more commonly recognized evidences of syphilis. A direct infection transmitted in antenatal life has been proven by the history in individual cases. Although syphilis in the fetus may so affect nutrition as to interfere with development, the form of syphilis in the newborn in which hemorrhage occurs is not necessarily accompanied by cachexia, as the infants may be well nourished. It bespeaks, therefore, a constitutional tendency.

As to the terminology, there seems to be a tendency to accept the term purpura as applicable to hemorrhagic conditions in the newborn. This designation, however, should include not only the skin hemorrhages, but internal extravasations. On the other hand, it would hardly be proper to apply to the general hemorrhagic conditions observed in the newborn the term purpura hemorrhagica which is reserved for the severe conditions seen at a later period. It appears, therefore, that the latter term should remain as a special designation, notwithstanding its applicability to the majority of instances of bleeding in the newborn.

The term syphilitic purpura is applicable to those purpuric

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conditions which are due to syphilis, but in accepting it, the tendency in syphilis, as in other conditions marked by hemorrhage in the newborn, to general bleeding, in contradistinction to skin hemorrhage, should be borne in mind.

The term hemophilia is inapplicable to the hemorrhagic conditions which enter into the differential diagnosis of syphilis in the newborn. Hemophilia is a later manifestation and bears evidences of being an hereditary tendency. It usually affects male children. This is not gainsaying the fact that persistent wound hemorrhage may occur as a complication of purpura (*vide*, A Case of Icterus Neonatorum with Purpura and Persistent Hemorrhage from a Punctured Wound, J. E. Talley, ARCHIVES OF PEDIATRICS, September, 1904, p. 695). The writer has observed one instance of oozing from the skin in a syphilitic infant. The lower lids and the flexor surfaces of the ankles were the points from which oozing took place.

The term "Hemorrhagic Disease of the Newborn," which has been adopted by Townsend and Rotch, implies a condition dependent upon a special pathological change, such as is seen in acute fatty degeneration of the newborn; whereas, the hemorrhagic tendency in the newborn is due to a variety of causes and is incidental to the development of this age. For this reason we may speak of it as a diathesis rather than a disease.

Syphilis in itself, where it can be proven to exist, is in all probability not the primary cause of hemorrhage. It is more probable that the constitutional effects of syphilis underly the degenerative changes in the blood and vessels, which lead to hemorrhage. The maternal evidences of infection are often obscure; the infection may be transmitted directly from the father and present no evidences in the mother, or the history may be misleading on account of the ignorance of the parents. In a case reported by L. E. Frankenstall (*American Journal of Obstetrics*, Vol. XLV., p. 270), it appeared reasonable to connect the hemorrhagic condition in the infant with the existence of tabes in the father, an antecedent condition which would have been entirely overlooked if the history had not been carefully investigated.

As to frequency, among 3,364 children born at the Philadelphia Lying-in Charity, between the years 1901 and 1904 there were forty-five instances of hemorrhage, the majority of which were fatal. Among this number of infants there were ten in whom the history of syphilis was either obtainable in the parents,

or the clinical or postmortem evidence of syphilis was present in the children themselves.

Leakage may occur from the minute blood vessels in the skin, mucous surfaces, the serous membrane, the meninges and brain, and the parenchyma of the various organs and glands. Hemorrhage may appear also from the conjunctiva, the ears and umbilical cord. The skin hemorrhages may be in the form of oozing from the capillaries, very often seen occurring from the roll of skin which surrounds the cord. Bleeding may occur also from fissures at the mouth or anus. It may take place in the vesicles in pemphigus or from the base of the vesicles after rupture. Extensive extravasations between the skin usually affect dependent portions of the body, as the feet and ankles, also those surfaces which are exposed to pressure after birth, as the dorsal region, the buttocks and the extensor surfaces of the arms.

Extensive hemorrhage in the lower region of the abdominal wall and the scrotum or vulva is consequent to the ligation of the cord. A review of the fetal circulation will recall the fact that interference in the current of the umbilical arteries will induce a backward pressure in the iliac arteries, which affects their distributing branches, resulting in extravasation in the regions supplied by the latter. This brings us to the question whether there may not exist a general heightened arterial pressure in utero as a result of obstruction in the placental circulation due to obliterative changes in the vessels. Not only are the placental vessels affected by the syphilitic changes but those of the cord as well. It is even conceivable that torsion of the cord, frequently observed in instances of intrauterine syphilis, may have the effect of increasing the resistance in the fetal circulation. As a consequence of these various factors we may conceive of a condition of heightened pressure which shows its result at the time of birth when the demands upon the circulation are suddenly increased.

The extent of the hemorrhage varies. In the skin the epidermal layer may be invaded by extravasation in the form of petechiæ. A more extensive hemorrhage is apt to occur in the corium, elevating the epidermis. The areas involved are the buttocks or flexor and external surfaces of the thighs, the feet or the whole of the lower abdominal region. The discoloration is marked, presenting a dusky violet hue limited by a hyperemic zone. The contrast between the areas of discoloration and the icteroid skin surrounding them, observed in the majority of cases,

is striking. The subintegumentary tissues, in pronounced cases, is involved; the hemorrhage permeates the fat, following the course of the connective tissue trabeculæ. The tissues may be generally thickened by the blood which is effused within the fat and which, in severe cases, invades even the muscles.

As to congenital hemorrhage, it may appear in the skin, usually in the form of petechiæ. Hemorrhage from the cord and mucous surfaces may also make their appearance soon after birth. Probably the most frequent early hemorrhage is in the form of hematemesis, which may begin with the effort to dislodge mucus from the pharynx or with the vomiting of meconium in instances of premature attempts at respiration. Later hemorrhages may appear from the fifth to the twelfth day. In fatal cases the termination is reached in from three to five days after the beginning of the bleeding. In cases which end in recovery the oozing may last for two or more weeks with a gradual lessening of the amount of hemorrhage; or, more frequently, as in hemorrhage from the cord for instance, may be arrested suddenly. In intracranial hemorrhage the symptoms of pressure begin early. Cases attended with intense icterus, with fever and rapid emaciation run a rapidly fatal course. Those with sudden onset and extensive extravasation or loss of blood by internal bleeding are unfavorable. Hemoperitoneum and subarachnoid hemorrhage are the accompaniment of severe diathesis. They point usually to early death. Bleeding from the cord is not necessarily fatal. In instances of continuous oozing, even to the point of exsanguination, a sudden cessation of the hemorrhage may occur and the child begin to improve.

Internal hemorrhages vary in their form according to their situation. In the lungs the bleeding is in the form of small apoplectic areas distributed generally (usually in the upper lobes) or peripherally in the form of infarcts. The subserous hemorrhages are usually limited to minute ecchymoses, although, as an exception to this, subcapsular hemorrhages of the liver may be extensive; it is not uncommon to find postmortem a subserous extravasation overlying both the right and left lobes of the liver divided by the suspensory ligament in the mid line and limited on either side by the costal borders. Hemorrhages in the spleen and suprarenal and thymus glands are usually in limited areas. In intraperitoneal hemorrhage the blood is usually unclotted. In subarachnoid hemorrhage the blood is held in a loosely formed clot which breaks down into fluid blood with the lightest handling.

Hemorrhage affecting the mucous membrane may be in the form of free bleeding, which usually does not undergo clotting, or it may be in the form of submucous ecchymoses. The latter are seen particularly in the stomach between the rugæ, also in the upper intestinal tract. Bleeding into the connective tissue may be more or less extensive. A more or less frequent site for this form of bleeding is in the sheath of the umbilical vein.

The tendency to bleeding hinges primarily upon the comparative heightening of arterial pressure in the newborn. This is an inheritance from intrauterine life and is probably due to the limitation of the circulation by the absence of the pulmonary circuit. The comparative thickening of the adventitia in the vessel walls is corroborative of the existence of high arterial pressure. It is possible that this condition of the blood vessels may serve as a protection against the danger of a sudden reduction in the course of the circulation which results from the ligation of the cord and which may be only partially relieved by the establishment of the pulmonary circulation. It is necessary, however, to look for a more direct cause of hemorrhage than excessive pressure, otherwise the more or less common interference with the circulation, as from pressure from prolapse or winding of the cord during labor, and after labor from ligation of the cord, would be followed by hemorrhage. The pathological condition of the vessels in syphilis is confined, according to Schutz (Fischl, *Archiv. f. Kinderhk.*, Vol. VIII., 1886-7) to a thickening of the walls due to an hypertrophy of the muscular layer.

In spite of these facts the arterial changes in syphilis are not sufficiently distinctive to account for the tendency toward hemorrhage, as far as the arterial system is concerned. At best the consideration of the arterial changes is somewhat wide of the mark, as the extravasation occurs (except in instances of hemorrhage from the cord and in some instances of intracranial bleeding) in the form of capillary oozing. It therefore seems more likely that the relationship between the character of the blood and the containing capillaries is disturbed. The coagulability of the blood is certainly reduced. The persistence of bleeding from the cord in spite of ligation is evidence of this. The benefit from the internal administration of drugs which are supposed to increase the coagulability of the blood, as calcium chlorid, has been demonstrated in instances where ligation was entirely without effect.

Recent bacteriological research has established the infectious cause of purpura in distinct instances. It is doubtful, though, that the presence of microorganisms postmortem should point conclusively to their existence as a direct or primal cause of hemorrhage in a large number of cases. In a very interesting series of cases of infectious origin described by Hamill and Nicholson (ARCHIVES OF PEDIATRICS, September, 1903), cultures made from the spleen, the lungs, the umbilical vessels and the heart's blood revealed the presence of microorganisms which in all likelihood were present in the environment of the children—in the air, possibly from the milk, upon the hands of the nurse or in the water with which the children were bathed. Conspicuous among these organisms was the colon bacillus. Relative to syphilis, however, these findings would make one incline to the view expressed by Capps (*American Journal of Obstetrics*, Vol. XLV., 270, discussion) that it is possible during the last few days of life for various microorganisms, especially the colon bacillus, to pass from the intestinal tract into the blood. The organism is thus to be found both in the blood and viscera after death. What applies to the colon bacillus is likely also the case with the staphylococcus aureus and the bacillus aerogenes lactis, the former being found in typical growth in 4 out of 6 cases reported by Hamill and Nicholson. Under these circumstances it is at least worthy of emphasis that the presence of microorganisms does not exclude the possibility of syphilitic infection. Further than this, syphilis is likely to play a more prominent rôle in instances of purpura ending in recovery than is infection due to the presence of microorganisms, as the latter is usually fatal.

Speaking generally, it would likewise be an error to overlook in many cases of supposedly infectious origin, syphilis, for, among other causes, notwithstanding the fact that sporadic instances of purpura due to infection may occur, it is beyond the probabilities that an infection so grave as this proves itself to be in certain instances, and in which the organisms present are found to originate in the infant's surroundings, should attack the children singly; yet in 45 cases of those noted in the records of the Lying-in Charity mentioned above none of them came in groups, the only parallel cases as to the time of occurrence being those in an instance of twins (Case No. 237).

In the matter of diagnosis hemorrhage appears usually in children who do not present the characteristic signs of syphilis.

Where this rule does not hold good the congenital manifestations, such as pallor, rhagades, shrunken skin, are more often observed than the hereditary manifestations, such as the characteristic eruption and snuffles. The more distinct types of the latter form of syphilis seem to make their appearance in cases in which the infection is more or less recent, while in the hemorrhagic cases the bleeding seems to be the result of certain constitutional changes due to remote infection. The clinical manifestations which accompany hemorrhage are various, depending upon the development of the infant as to prematurity, upon the degree of blood dyscrasia, and probably upon the thoroughness of the specific infection. In my cases the following course of events and their relationship to the histories was noted:—

CASE I.—Death following umbilical hemorrhage, with wasting and signs of cerebral pressure. Autopsy revealed intracranial hemorrhage. The mother gave a history of infection by a former husband.

CASE II.—Death in a premature infant following umbilical hemorrhage. Clinical evidences of syphilis during life in the form of vesicular eruption of the plantar surfaces. Autopsy:—Subarachnoid hemorrhage, infarction of both kidneys. A history in the mother of previous miscarriage in the third month.

CASE III.—Death from asphyxiation. Skin hemorrhages in the form of more or less extensive extravasation. Syphilitic enlargement of the liver, the abdominal circumference reaching 31cm. History of syphilis in the mother. The autopsy revealed nothing of interest beyond the liver condition.

CASE IV.—Death immediately following birth in a premature infant. Bleeding from the cord. Petechial eruption. Marked syphilitic degeneration of the placenta.

CASE V.—Ecchymosis of the serous membrane and minute apoplectic areas in lungs revealed by autopsy. Tubercular syphiloderm in palmar surfaces. Laryngeal obstruction and marked scaling of the skin during life.

CASE VI.—Hemorrhage from the mouth and cord complicated by icterus. Typical manifestation of congenital syphilis in the form of emaciation and pallor. Autopsy:—Chronic hepatitis and suprarenal hemorrhage.

CASE VII.—Hemorrhage from the cord. Death following inanition in the course of suppurating gummata of the scrotum and great toe. No autopsy.

CASE VIII.—Stillborn infant. Gumma on the external border of both feet. Scleral hemorrhage. Autopsy:—Subarachnoid hemorrhage, enlargement of the thymus.

CASE IX.—Stillborn infant. Subcutaneous extravasation. Evidence of leakage from the cord after ligation. Bullous eruption of the palmar and plantar surfaces.

CASE X.—Stillborn infant. Cutaneous hemorrhage. Autopsy:—Pericranial and subperiosteal hemorrhage, subcapsular hemorrhage of the liver. Syphilitic periosteitis and necrosis of the cartilage of the nose, in the mother.

Perhaps the most interesting clinical accompaniment of hemorrhage is icterus. It is present in some degree in almost every case. According to one theory icterus is a primary condition, which is followed by hemorrhage due to its toxic effect. Excessive jaundice usually increases the gravity of the outlook. There is no doubt that the presence of bile in the blood decreases its coagulability, showing that the bile has probably a disintegrating effect upon the blood. It seems more likely, however, considering the large number of children affected with jaundice without consequent hemorrhage, that it is secondary to the blood changes that produce hemorrhages. It may be, on the other hand, that, in weakly children, the invasion of the blood by bacteria present in the intestinal tract may give rise to jaundice, the result of their toxic action, so that in some cases the icterus may be a mere accompaniment of the hemorrhagic condition.

As to the conditions found postmortem, Behrend (*Deutsche Zeitschr. f. Prakt. Med.*, Bd. V., pp. 289-301) found in a case with a clear history of syphilis pulmonary lesions consisting of subpleural effusions with white hepatization and numerous gummatous nodes. The infant was born with a petechial eruption. In 2 of the cases described in the foregoing portion of this paper, apoplectic points were found in the lungs. The combination of hemorrhages with other pulmonary evidence of syphilis in the lungs is, in the writer's opinion, rare. The only instance among the cases of congenital syphilis in the writer's experience in which gummata were found in the lungs was one without accompanying hemorrhage. Behrend mentions, also, in the case alluded to, a fatty degeneration of the pappillæ of the heart muscle.

Fischl, on the other hand, in a case of hemorrhagic syphilis found that the musculature of the heart was not markedly altered. Fatty degeneration was not apparent; the nuclei were sharply

outlined and lightly stainable. Beneath the pericardium small hemorrhages were to be seen, penetrating at individual points into the muscular surface.

Syphilitic children with evidence of internal hemorrhage require prompt treatment. The effort should be to sustain their flagging powers of resistance. Oil baths, alternating with mercurial inunctions, are indicated. The child, however, should be kept in the incubator and disturbed as little as possible, except for the necessary measures of treatment. In fact, rest is the first indication. For fever the ice cap is indicated. In intracranial hemorrhage the latter is directly useful as a local measure. In extensive skin hemorrhages rubbing for the purpose of carrying out inunctions should be omitted. In severe cases of melena peristalsis should not be encouraged. With this in view the nourishment should be given frequently in small quantities and dry warmth should be applied to the body.

The following drugs have been used internally:—Suprarenal extract, half grain doses repeated. Adrenalin solution, 1-1000, one drop, in repeated doses. Gelatin water, in the proportion of two drams to one pint. Fluid extract of ergot, one drop doses. Talley, in an interesting case in which continuous bleeding resulted from a puncture (alluded to above), noted a favorable result from the use of calcium chlorid in half grain doses given every two hours.

(The discussion of this paper will be found on page 70 of this number of ARCHIVES OF PEDIATRICS.)

Pathogenesis of the Scoliosis of Childhood.—Mechanical theories may explain some of the cases of scoliosis, but no one theory can explain all of them. The fundamental condition must be sought for in a disease of the vertebral column. C. Deuschländer (*Zeit. f. Orthoped. Chir.*, 1903, Vol. XI, p. 383) points to v. Recklingshausen's description of infantile osteomalacia. It is not a rachitic process, but one of softening and melting away, due to congestion of the blood vessels. Anomalous blood vessel walls and mechanical irritation due to increasing pressure are the predisposing factors; the process once begun will continue itself, due to the decreasing ability of the spinal column to support the weight of the body. Coexisting deformities, as flatfoot, genu valgum, etc., are a further expression of the disease.—*American Medicine.*

NOTE ON THE DURATION OF THE PRODROMAL PERIOD IN RÖTHELN.*

BY D. J. M. MILLER, M.D.,
Philadelphia.

How long is the prodromal period of rötheln? In measles and scarlatina the stage preceding the eruption is reasonably fixed, but of rötheln this can scarcely be said. For, although it is true that, on consulting the abundant literature upon the subject, it will be found that the majority of writers consider the initial symptoms of this disease to be of extremely short duration or even absent entirely, yet there are others who ascribe to rötheln longer and more definite prodromes. Steiner denies their presence altogether (observed none in 21 cases). Oesterreich, Vogel, Klaatsch, Park, von Nymann, Ellis (slight or absent premonitory stage, one of the "chief points" in the diagnosis) and Bendix saw no definite premonitory symptoms. Others, and they comprise the great majority of observers, assert that, in most cases, such symptoms are either wanting entirely, the eruption being the first indication of illness, or are of slight import and short duration, lasting from a few hours to one, or at most, and very unusually, two days. Cases exhibiting long or severe prodromes, they declare, are anomalous. Among those who hold to this view may be mentioned:—Von Jürgensen, Thomas (never more than $\frac{1}{2}$ a day), Griffith (150 cases), Rott (17 cases), Heubner (few hours to $\frac{1}{2}$ a day), Dawson Williams (most cases rash first symptom; in others, from 12 hours to 2 days; seldom delayed beyond 2d day), Baginsky, Eustace Smith (average 24 hours), Hardaway, J. Lewis Smith, Squire, Atkinson, Holt, Plant, Unger and many others, too numerous to mention. Among those, on the other hand, who, while admitting that the invasion period of rötheln is often absent and its symptoms indistinct, have observed in their cases longer and more definite prodromes than the writers just referred to, are Roth ($\frac{1}{2}$ to 3 days), Claussen (3 days; some cases 6 to 7 days), Cheadle (3 days in 7 out of 8; in 1 case, 6 days), Emminghaus (3 days), Lindwurm (4 days), Thiefelder

* Read before the Philadelphia Pediatric Society, December 13, 1904.

and Mettenheimer (1 to 3 days), Meigs and Pepper (2 to 4 up to 7 days), Hemming (3 to 4 days), Edwards (3 days, average of 166 cases), Monti and Trousseau (1 to 4 days; generally well-marked).

A careful review of the testimony of observers upon this question would seem to show that in most cases the prodromal stage of rötheln is either absent, or does not exceed 24 hours, but that, occasionally, it may be prolonged to 2, 3, 4, or even 6 or 7 days. In reference to those cases in which no initial stage was observed, a probable explanation, of some of them, at least, is that, as the eruption is usually first noticed on rising in the morning, brief prodromes may have occurred during sleep.

The writer, while he is in accord with the great body of observers that the initial symptoms of rötheln are usually of short duration and more or less indefinite character, is inclined to believe, from the study of some recent cases, that the prodromes are prolonged and distinct much oftener than is generally supposed; and that the reason they are so seldom accurately determined is because physicians rarely have the opportunity to personally observe patients during this period, but must rely upon the statement of nurses and mothers. This belief is based upon 3 cases in which the unusual opportunity was afforded of closely observing the patients from the appearance of the first symptoms to the outbreak of the eruption; and upon the fact that, among many instances of rötheln observed by the writer, in the only cases (*viz.*, the 3 here reported) in which it has been possible to definitely fix the prodromal period, the initial symptoms had a longer duration than is usually attributed to that affection, although this, of course, may have been purely coincidental.

That the number of cases is extremely small, if not altogether too small, from which to draw conclusions, is probably true; but it must be remembered that a few cases carefully and accurately studied may be as valuable as a hundred where the opportunities for observation have not been so favorable. For these reasons it has been thought worth while to place upon record the following cases:—The first patient was a girl of thirteen, the writer's daughter, who had been ailing for three days with what was thought to be a mild influenza, *i. e.*, with malaise, headache, pain in the legs and joints, and some loss of appetite; along with these symptoms were slight conjunctival injection and pharyngeal hyperemia, a temperature of from 99° to 100° F., and slight sore

throat. On the morning of the third day the post-mastoid glands were found enlarged and tender. The next morning (the fourth day) the patient awoke covered with the characteristic eruption, if such a word may be used, of rötheln. With the appearance of the latter, the temperature was $100\frac{2}{3}^{\circ}$ F., but fell quickly to $99\frac{2}{3}^{\circ}$ F., and in three days the patient had practically recovered from a mild but typical attack of german measles. In this case, then, the prodromes, which were distinct and well marked, lasted about 72 hours, *i. e.*, the eruption appeared at the beginning of the fourth day. The other 2 cases occurred in a family where the writer is in almost constant attendance, and where the anxious and careful mother seeks his advice on the slightest deviations of her children's health. The eldest of these children, a boy of eight, first showed symptoms of what appeared to be a trifling cold, on the morning of April 2d. That night he had slight fever, although the temperature was not taken. The next day he complained of nausea, and said that his legs "felt light" and tired. At noon the temperature was 99.5° F., and that evening 100° F. All that day and the next he played about and seemed fairly well, although there was some languor, slight injection of the conjunctiva, hyperemia of the throat (but no subjective symptoms of sore throat), and occasional sneezing. The temperature on the evening of the third day was 100° F., and the posterior cervical lymph nodes were enlarged. On the morning of April 5th (the fourth day), the rash was first noticed behind the ear and on the face. The subsequent course was characteristic of rötheln, the patient quickly regaining his usual health. The initial symptoms in this patient, though slight, were unmistakable, lasting about three days, the eruption appearing at the beginning of the fourth day.

Exactly fourteen and one-half days, *i. e.*, on the fifteenth day after the boy's first symptoms, and eleven and one-half days from the appearance of the eruption, about 9 P.M. on the evening of April 16th, his sister, aged five, having gone to bed apparently well, was noticed to have fever. The next morning her temperature was 99.5° F., that evening the same. With this there were coated tongue, some languor, decided redness of the conjunctivæ and pharynx, but no marked conjunctivitis or photophobia. The cervical lymph nodes were not enlarged. These symptoms continued until the 22d of April, the child playing about as usual, although the temperature was constantly a little above normal,

99° to 99½° F. On the morning of the last date, *i.e.*, on the 22d of April (the sixth day), the patient awoke well covered with the eruption of rubella and a temperature of 102° F. The attack, however, was mild, and the child promptly recovered. The prodromes in this patient were also quite distinct, though less pronounced than in the others, and lasted five and one-half days, the eruption appearing on the sixth day. All these children had suffered from measles, and all had been exposed to rötheln, and, in addition, had other symptoms that placed the diagnosis beyond question.

Opposed to the above experience should be mentioned that of Forchheimer, who observed in one of his own children some indisposition for a short time only before the eruption appeared. Koplik, on the other hand, who saw no prodromes in the majority of his cases beyond a few days of preliminary fever, relates 1 case in which suffusion of the eye preceded the eruption by four days, and 2 others, in one of which enlargement of the cervical lymph nodes was present for six, and in the second for fourteen, days prior to the eruption, although he seems to regard such slight affections as symptoms of the incubation, rather than of the prodromal, period. An interesting feature, not referred to in describing the last of the writer's cases, was the distinct remission after the initial symptoms on April 16th; during the second, third, and fourth days of the prodromal period, the symptoms were so slight that they could have easily escaped notice. Toward the end of the fifth day, however, there was a slight increase of fever (100° F.), and if the patient had been first seen then, her symptoms might have been regarded as beginning on that day. Emminghaus is the only author who speaks of this tendency to remission and exacerbation during the stage of invasion, and its occurrence may explain why in some instances prodromal symptoms are not observed.

In conclusion, may it not be of the prodromal period, as it is of the eruption and other symptoms of rötheln, that it is an affection less fixed and regular in its features than any of the eruptive fevers; hence the various ways in which it is described by various observers; hence, also, the confusion as to its symptoms, and the doubt, which still exists in some minds, as to its independent nature.

(The discussion of this paper will be found on page 71 of this number of ARCHIVES OF PEDIATRICS.)

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Early Diagnosis of Typhoid Fever by Puncture of the Spleen.—E. Adler (*Deut. Archiv. für klin. Med.*, January 22, 1903) claims splenic puncture to be a valuable means of diagnosing typhoid fever in the early stages. He found typhoid bacilli in over 90 per cent. of all cases tested, and they were present in every case where the clinical diagnosis was positive. The test is positive even in the first days, before splenic tumor can be demonstrated. Puncture of the spleen was practised by the author in 300 cases, without the slightest unfavorable result. The technic is minutely described. Especial attention is called to the after treatment, which consists of absolute rest, preferably on the back, for twenty-four hours. Baths are replaced by cold packs. An ice-bag is placed over the spleen. As contraindications to puncture of the spleen are mentioned the hemorrhagic diathesis, advanced age, and pronounced degeneration of the organs in protracted cases. The early diagnosis of typhoid fever is now of especial importance in connection with serum therapy, since this mode of treatment, as practised by Chantemesse, has been invariably successful when employed before the eighth day of the disease.—*American Medicine.*

Clinical Memoranda.

A CASE OF RECURRENT VOMITING; DIACETIC ACID IN THE URINE.

BY WALTER G. MURPHY, M.D.,
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During the month of October, 1904, I was called to see A. B., male, *aet.* 4 years, native of Hartford, who had recently passed through a severe and uncontrolled attack of vomiting.

Family history.—Paternal grandfather had frequent attacks of inflammatory rheumatism; father suffered from tonsillitis, often terminating in quinsy. A decidedly neurotic history is present on the maternal side.

Personal history.—Breast fed for one month, then given cow's milk and cereals; always constipated; backward in teething and walking; did not begin to gain until the ninth month. For the past year and a half patient has been subject to attacks of vomiting. These attacks come on at irregular intervals, at times once in three or four weeks. The longest period between attacks is three months and the shortest three weeks; they last from twenty-four hours to five days and are not caused by errors in diet. No prodromal symptoms are evident, but for a few hours the child may act tired and perhaps is more irritable than usual. Generally, without warning, he begins to vomit and for twenty-four hours he vomits every half hour; at first, the contents of the stomach, which is always very acid, and then simply water, often there is retching. Mucus is rarely present. During the vomiting period he is very thirsty, but cannot retain the water he drinks. He is always constipated during the attack, and at times the movements are clay-colored; the odor is very disagreeable. At about the third day the vomiting ceases, unless too much food is taken, and he then becomes drowsy and stupid; he is always prostrated. The fourth day he can take more nourishment. At this time there is often a fine itching eruption. The urine is scanty until the fourth or fifth day and then becomes profuse and is loaded with urates. After the attack is over the child, except for weakness, acts as well as usual. During the interval he has no gastric symptoms, but is apt to be constipated.

Physical examination showed a poorly developed, anemic

child, weak and languid from the effects of the vomiting. Heart action rapid, but no evident organic disease, lungs normal; stomach area apparently not enlarged; liver dullness normal; intestines, large and small, somewhat distended with gas. Temperature normal. No glandular enlargement, urine normal, reaction decidedly acid.

The *treatment* was based upon the uric acid theory of this disease. The diet, as suggested by Starr, was milk with vichy, soft boiled eggs, fish, bran and whole wheat bread, chicken and meat broth with spinach, celery, young onions and cauliflower, avoiding particularly an excess of starches, sweets and red meats. He was given an oil emulsion, which was well borne; iron in the form of eisenzucker; a moderate amount of exercise and plenty of fresh air. He was given, also, vichy in sufficient quantity to maintain a slight acidity of the urine, and Hunyadi, each morning. The urine was tested twice each week, and was always slightly acid; repeated examinations showed no abnormalities; quantity in twenty-four hours normal. He was not unusually thirsty and did not complain of pain. Improvement was rapid until the night of November 10th, when, after more exercise than usual, he was restless and did not sleep well. Vomited twice in the night and at five in the morning he vomited a half-pint of sour liquid. He seemed hungry for breakfast, and ate a soft boiled egg and drank a glass of milk at 8:30. This he vomited at 10:30, and had undoubtedly started in one of his attacks. Vomitus very acid. Temperature 98.8° F. Pulse 80. He was restless and uncomfortable. Bowels had not moved thoroughly the day before. He was given ʒss of castor oil in the night; this was retained. Bowels moved at 9:30 A.M., light color and very offensive. I saw him at 10:30. Urine very slightly acid.

From his previous treatment, the careful diet, the use of vichy and the slightly acid urine, it was evident that something besides uric acid was to be sought for to account for the very acid condition present in the food vomited. This acidity was marked, more so than usual in stomach cases.

Examination of urine obtained at this time showed:

Color clear; specific gravity, 10.18; acid in reaction; no albumin; no sugar; indican, a faint reaction; diacetic acid, a decided reaction.

With the presence of diacetic acid in the urine, the proper treatment was evident. He was given grs. xx of sodii bicarb. well

diluted every two hours. During the day, after beginning the soda, the child vomited once. He retained water and malted milk without difficulty.

November 12th. Vomited three times during the night and day, a small quantity of clear water; no food. No acid evident; dose of soda decreased. Is quiet and somewhat drowsy. Bowels moved twice during the day; odor not marked. Temperature, 98.8° F.; pulse, 80, regular and soft.

November 13th. In about the same general condition. No vomiting; retains nourishment without difficulty. A slight puffiness noticed about the eyes; skin hot and dry; does not pit on pressure. Some edema appeared about the ankles during the day; no pitting. Urine contains no albumin or sugar. Diacetic acid still present, but in less amount. Patient quiet and inclined to sleep, but is easily aroused. Microscopical examination of urine negative. Total quantity of urine decreased. Temperature, 98.6° F.; pulse, 80, without tension.

November 14th. Patient much improved. Quantity of urine increased. No edema evident. In previous attacks on the fourth day there had been an eruption; this time there was no eruption, but an edema appeared. I am of the opinion both the eruption (urticaria) and the edema were caused by the increased acidity; there was no other condition to account for it.

November 15th. Patient much improved. Slept well; no nausea; retains food without difficulty; quantity of urine increased; examination of urine: cloudy, with flocculent precipitate; specific gravity, 10.20; reaction slightly acid; no albumin; no sugar; amorphous urates and phosphates; diacetic acid; very faint reaction. Under the microscope, a few uric acid crystals and ditritus were detected. The mother noticed less precipitate in the urine than in any previous attacks.

The reason for reporting this case is the presence of diacetic acid in the urine and the prompt and satisfactory action of the bicarbonate of soda as a remedy. In this attack, which closely resembled all others he has had, the child vomited only eight times, four before and four times after the soda. He was not distressed as much as commonly noticed. He could retain nourishment, without difficulty, throughout the attack, after the first vomiting, the morning of the 11th. In all other attacks, when soda was not given in large doses, vomiting was a serious symptom. Generally, for the first twenty-four hours, vomiting occurred every

half hour, or oftener, and no food of any consequence could be retained until the fourth day. The mother tells me she does not remember an attack in which the symptoms were so mild. Even in the very light seizures, lasting only twenty-four hours, the child vomited more than in this. I attribute this entirely to the action of the soda.

The cause of these peculiar attacks of vomiting coming on with a certain regularity and following the same general cause, without exciting conditions and unaccompanied by marked pain or temperature or evidence of gross gastric changes, is uncertain.

Gee, who first described this condition in 1882, was of the opinion it was a crisis of intestinal origin. Holt says it is connected in some way with the formation and excretion of uric acid, but is not certain that all cases have the same origin. He finds these cases principally in gouty and neurotic families, and believes the attacks resemble migraine in many ways. Herter has found a lessened reaction of urea during the attack. Rachford, Starr and Shaw, also, incline to the uric acid theory of the disease. Snow considers the attacks a gastric neurosis.

Marfan has recently published an article on acetonuria as a cause of recurrent vomiting; he has found acetone and diacetic acid in the urine. Morey, also, has found acetone in the urine. Griffith reports 2 cases in which acetone and indican were found. In his opinion the disease is a neurosis of toxic origin. Edsall reports 6 cases, due to acetone and diacetic acid, in which 5 were cured and 1 doubtful, by the use of bicarbonate of soda, and Pierson has had 3 cases and knows of a 4th cured by the soda treatment. Morse and Townsend, also, report very favorable results.

75 Pratt Street.

Difference in the Scolioses of Male and Female Individuals.—A. Sutter (*Zeit. f. Orthoped. Chir.*, 1903, Vol. XI., p. 298) finds that the relation of scoliotic male patients in sanatoriums to female patients is as 1 : $7/10$; in school statistics, however, it is as 1 : 1; scoliosis, therefore, is as frequent in one sex as in the other. They occur somewhat earlier in the life of females than of males. The greater number of the vertebral distortions is convex toward the left, but a larger proportion of the male distortions is toward the left than of the female. In boys it is usually the upper portions of the spine which are deformed; in girls the lower are deformed almost as often as the upper. The deformities are more marked in boys than in girls.—*American Medicine.*

RACHITIS, POTT'S DISEASE, AND SPINAL CORD INVOLVEMENT RESULTING IN A SPASTIC PARAPLEGIA.*

BY EDWARD JUDSON WYNKOOP, M.D.,

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Rachitis is, as is well known, a disease common to early childhood, and usually occurs before the second year.

Pott's disease, or caries of the spine, occurs more often than any other single tuberculous joint disease, and this also is found in early childhood; more often between the third and fifth years.

Spastic paraplegia, occurring after Pott's disease, is met with occasionally, due, usually, to a Pott's myelitis or a compression myelitis, and also, according to Whitman, when there is a degeneration of the distal portion of the pyramidal tracks due to imperfect development.

The association of these conditions in the same patient seems to me of sufficient interest to bring to your attention the following brief history:

P. S., aged fifteen months, came under my care in the winter of 1903. The following history was obtained from the mother: Both parents living, and in so-called good health. The mother, however, is frail looking and anemic. No history of consumption. The father is narrow chested and round shouldered, though he has never been ill. There is no history on his side of consumption. The father states, however, that he was never a rugged child and was three years old before he began to walk. There are two other children in the family, both healthy. One child died in early infancy; cause not known.

The patient was a full term healthy boy, but mother had no milk so could not nurse him, consequently he was brought up on cow's milk. The child always acted well and strong, but contracted bronchitis his first winter, and had a cough all winter long and well into summer. The next winter he had a return of the bronchitis which continued till January, 1903, when bronchopneumonia developed.

When a little over a year old the boy fell out of his carriage,

* Read at the Syracuse Academy of Medicine, November 8, 1904.

striking on head and back. This did not seem to hurt him any. About two months later, however, his mother noticed that when lifting the child by the shoulder, or when handling him, he would cry out as if in pain. Night cries were not present. The child had never tried to walk, but would sit up in a chair and use his arms and legs freely and, as his mother expressed it, "always enjoyed a chance to kick."

The bowels had always been constipated. Urine always passed freely. The child was inclined to sweat a good deal, especially around the head.

The case came under my care in January, 1903, while the boy was suffering from bronchopneumonia. The physical examination showed the patient to be markedly rachitic; head, chest and abdomen all showing the typical signs. Teeth badly decayed. The child's mental condition seemed about average. Legs and arms well developed. He looked fairly well nourished. Both lungs showed bronchopneumonia.

While inspecting the chest one day my attention was called to the condition of the spine, and for the first time a prominence in the upper dorsal region was noticed. The reflexes of the lower extremities at the time were not tested, but the child moved his limbs freely, the same as he had always done. It was at this time that I obtained the history of a fall, followed by pain on lifting, etc. The child made a slow recovery from the pneumonia, some bronchitis persisting for a long time. After the acute trouble in lungs had subsided the spine was frequently tested, and the presence of Pott's disease was positively diagnosed.

In March of the same year, he was sent to the Woman's and Children's Hospital and placed on a cuirass with juremast plaster jacket, and extension of lower extremities. This was continued for some months, during which time the child had night cries, variable temperature, and several attacks of bronchitis. It was not until he had been in the hospital for some time that the condition of the reflexes of the lower extremities were noticed and found to be greatly exaggerated, together with some muscular weakness and spasticity. The question of special involvement associated with rachitis and Pott's disease was considered probable.

The case was seen at the time by Dr. H. G. Locke, of this city, and later by Dr. H. L. Taylor,* of New York, and a positive

* In a personal communication Dr. Taylor stated that he considered the case one of Pott's disease complicated by a pressure myelitis.

diagnosis of spastic paraplegia, accompanying the rachitis and Pott's disease, was made.

The present condition of the child shows improvement. The kyphosis is less. The nutrition of the patient generally is much better, and he has better movement of his lower extremities though the symptoms of a spastic paraplegia are still present. He seldom cries out at night, and only occasionally has a slight rise in temperature.

The treatment consists of fixation of spine and extension, massage of lower extremities, hypophosphite of lime, soda and iron, and iodid of potash with liberal diet and fresh air.

Two points of special interest are the Pott's disease and spastic paraplegia occurring with rachitis. The angular deformity of Pott's disease not disappearing on extension of spine, the rigidity and deformity remaining even after prolonged rest, fixation and extension, with the other symptoms make the diagnosis positive. The exact cause of the spastic paraplegia is due to either the Pott's disease, being the result of Pott's disease or compressed myelitis, or as Whitman states, a lack of spinal development. The history of this case seems to me to warrant the diagnosis of a spastic condition following a Pott's myelitis rather than anything else.

The following symptoms of a spastic paraplegia are present:—
(1) Motor weakness. (2) Increased muscular tension. (3) Increased tendon reflex. (4) The Babinski reflex.

My object in bringing before you the history of this case is to show the close association that may exist between rachitis, Pott's disease and spinal cord involvement.

Diabetes Insipidus in Children.—Popoff (*Medizin. Obos.*, XL., No. 13) states that 10 cases of this affection in children have been published in Russia, with 6 of diabetes mellitus. He describes 2 additional cases of the former and remarks that the maximum duration has been six years. An inherited nervous predisposition was evident in about half of the cases. In 2 there had been a preceding trauma affecting the head, with epileptic seizures. The age ranged from eighteen months to fourteen years. In treatment he gave valerian, Fowler's solution and quinin. The prognosis is favorable in general. In 4 out of 12 cases the improvement was marked and permanent, but a favorable environment is an important factor in recovery.—*Jour. Am. Med. Assn.*

ARCHIVES OF PEDIATRICS.

JANUARY, 1905.

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SUPPLEMENTAL SCHOOLS.

America has already made elaborate, although insufficient, provision for the idiotic and imbecile child in special educational and custodial institutions; nearly every state has one or more of these schools or colonies. The colony system for the care and education of the defective children is steadily coming into favor, both in this country and abroad. In these institutions it has long been the custom to depend upon systems of medicopedagogics for training and developing the backward child. The cure or amelioration of the mental defects of this unfortunate class has largely been brought about by a graduated plan of physiological training.

There is, however, a still larger and more promising field for

cultivation in educating the slightly defective child. This between-class cannot keep march with the normal child in the regular school system. The public schools of today are for the strictly normal child. There is no place in them for the mild types of backward children. The number of children of this class is by no means small. New York City alone has several thousand. What is to be done with them? Obviously they do not need the custodial care and segregation of the idiots and imbeciles. They make no progress in the regular schools whose operation, if they are allowed to remain, is often obstructed. Their companionship with the steadily advancing normal child engenders a careless disregard for education in all forms, and habits of viciousness and idleness are fostered; the keen chance of winning the goal is lost. These children should not be allowed to remain in the regular schools, even though permission of attendance is granted by the school superintendents. These children should have special, supplemental or secondary schools formed for them; such schools should be correlative adjuncts of the present public school system as has obtained now for sometime in Europe, especially in Germany. Nor is this suggestion essentially new even for this country. New York City already has a few special schools for this class in more or less successful operation, that have been maintained at other hours in the same school buildings as the regular schools.

Some systematic examination should be made in the case of every backward child dismissed from school attendance either by the school superintendent or medical inspector. The grade and character of mental deficiency should be carefully inquired into by properly trained alienists or psychologists appointed by the Board of Education for such purpose. In less populous centres physicians attached to nearby neurological departments of dispensary clinics might serve as examiners. The future line of medicopedagogical training should be outlined in each examination. The character and amount of school work may be modified from time to time after re-examination. In general terms it may

be said that these supplemental schools should be patterned on physiological principles. The concrete should be uppermost, especially in the beginning work. The regular school system with its early use of abstract teaching begins at the wrong mental end of training the deficient child; it is seed sown on barren ground, the soil of structural groundwork in mental development is not able to grasp the abstract, hence the importance of a modified training which uses sense development to the utmost. It is quite obvious to teachers of experience that the senses in these children must be "intellectualized" for a time to bridge the temporary defect, until growth makes good the normal state. Failure is more or less certain to result if the regular school system is but "cut down" as a pattern for these schools. The methods in teaching must be concrete, practical, industrial and manual in character. For this purpose various systems of manual training such as educational Sloyd and elementary carpentry for boys, and domestic handiwork and the like for girls, are admirably adapted. Such schools must not, however, deteriorate into trade schools merely, however valuable these may be. Mental and physical education in its broadest sense must be the goal idea. The details of location, personnel, equipment, length of school sessions, order of study schedule and the like, are matters for careful thought and study for teacher and physician; a problem well worth the earnest attention of everyone interested in educational matters. . .

L. PIERCE CLARK.

Pathology of Sudden Death in the Newly-Born.—

Among the cases described by Hammer (*Zeitsch. für Geb. und Gynäkol.*, L., No. 2) are 3 in which the death of the infant during or immediately after birth might have proved puzzling in a forensic case. In one, degeneration of the heart muscle was found and in another indications of a chronic inflammation of the placenta. In the third, nothing could be discovered, even with the microscope, in the fetus or placenta to which the immediate death could be attributed. A case is described in which an angioma cavernosum in the liver of a seven days' infant was discovered only with the microscope. In the case of the cyclops described, the infant bore no other trace of malformation.—*Jour. Am. Med. Assn.*

Bibliography.

The Practice of Obstetrics. Designed for the Use of Students and Practitioners of Medicine. By J. Clifton Edgar, Professor of Obstetrics and Clinical Midwifery in the Cornell University Medical College; Visiting Obstetrician to the Emergency Hospital of Bellevue Hospital, New York City; Consulting Obstetrician to the New York Maternity Hospital. Second Edition, Revised. Illustrated. Pp. xviii.-1153. Philadelphia: P. Blakiston's Son & Co. 1904. Price, \$6.00.

Dr. Edgar's "Obstetrics" has passed to the second edition in a few months. The time that has elapsed since the issue of the first edition has been too short to allow of complete revision, but a few subjects have been altered. Among them the tables of Dr. Winters have been corrected and made more suitable for everyday cases. In some of the formulæ the cream has been diminished and the percentages of milk sugar changed. Filtered water is used in place of the boiled water called for in the first edition.

This valuable work is so exhaustive and so much of the field is obstetrical that to mention one section dealing with infant feeding is hardly fair in view of the title of the volume. It is, however, intended that the obstetrician who has charge of the puerperal case shall know what is required for the infant who must for a few days, at least, be under his care. The volume is one of the most complete of modern writings on obstetrics and deserves its success.

Regional Minor Surgery. Describing the Treatment of those Conditions Daily Encountered by the General Practitioner. By George Gray Van Schaick, M.D., Consulting Surgeon to the French Hospital, New York. New York: International Journal of Surgery Co. Pp. 226. Illustrated. Price, \$1.50.

This book contains many facts of value both on subjects of minor surgical interest and on subjects not coming under this head. There are, however, many statements which are behind the times and discarded. The opening chapter on asepsis is an illustration.

The good in the book, of which there is plenty, is not put

concisely and tersely enough to be of the practical value to which it is entitled.

The general practitioner obliged for whatever reason to do his own minor surgery will find many suggestions of aid to him, although in case of unexpected difficulty a work on minor surgery from the surgeon's standpoint will have to be consulted. Wry neck, circumcision and harelip are some of the operations of interest to the surgeon who has the care of children. The book is attractive and the subjects are well arranged.

Examination of the Urine. A Manual for Students and Practitioners. By **G. A. de Santos Saxe, M.D.**, Pathologist to the Columbus Hospital, New York City. Illustrated. Pp. 391. Philadelphia, New York, London: W. B. Saunders & Co., 1904. Flexible leather. Price, \$1.50 net.

In this concise, practical volume the author presents one of the best and most explicit of the numerous volumes on the examination of the urine. The clinical interpretations of the urinary findings are clear and helpful.

The use of formalin in the urine for the preservation of a specimen is stated to be the cause of a peculiar precipitate supposed to consist of formalin and urea. Thymol or boric acid is more practical and does not produce any distortion of casts in the sediment.

For the detection of acetone in the urine, Legal's test is recommended as simple and sufficient for clinical purposes. Lieben's, Gunning's and other tests are also described.

A chapter on the characters of the urine in diseases of the lower urinary tract and of the genital tract is as helpful to the practitioner as to the student. In the same category may be mentioned the chapter on the diagnosis of the functional efficiency of the kidney.

The character of the book marks it as one intended primarily for the student of medicine, but the explicit directions for routine examinations in urinalyses, the descriptions of tests and the clinical explanations of urinary findings are so much needed by practitioners who are unable to make use of laboratories that the volume is recommended to physicians who make their own urinalyses as a reliable guide for urinary work. The clear print and convenient size of the book are to be commended.

Society Reports.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, December 13, 1904.

DR. J. H. JOPSON, PRESIDENT.

DR. MAURICE OSTHEIMER read a paper on

INCONTINENCE OF FECES IN CHILDREN.

He stated that incontinence of feces alone is very uncommon; incontinence of both feces and urine is rare, though enuresis occurs commonly among children. These cases were divided into those in which some cause for the condition was found, either general or local; and those in which the disorder was due to the general nervous condition of the child. In some of the latter the incontinence persists from infancy; in others it develops suddenly, in apparently healthy children over three years of age. Cases illustrative of these subdivisions were described—twelve from literature and four observed by Dr. Ostheimer. Recovery followed good food, fresh air, tonics and large doses of strychnin. Recurrence is common, whenever the child's general condition is not good.

DR. W. REYNOLDS WILSON read a paper on

HEMORRHAGE OF SYPHILITIC ORIGIN IN THE NEWBORN.

This paper will be found in full on page 43 of this number of ARCHIVES OF PEDIATRICS.

DR. J. H. JOPSON referred to the marked confusion that exists in the literature concerning the various forms of hemorrhage in the newborn, particularly in regard to the point whether the hemorrhage is infectious or is due to syphilis, hemophilia or other causes. Dr. Wilson's paper brought out this point very clearly, and in his classification he had succeeded admirably in differentiating between them.

DR. D. J. MILTON MILLER read a paper entitled

A NOTE ON THE DURATION OF THE PRODROMAL PERIOD IN RÖTHELN.

This paper will be found in full on page 52 of this number of ARCHIVES OF PEDIATRICS.

DR. WESTCOTT said he was pleased that Dr. Miller had emphasized the not infrequent existence of a distinct febrile prodromal period in r  theln, as he had encountered it a number of times, and considered it an important aid in distinguishing the disease from scarlet fever of mild type. Personally he had encountered very few cases that had assumed the so-called scarlatiniform type with sufficient mimicry to raise grave question in the diagnosis. When an eruptive disease suggested scarlatina so closely as to give rise to reasonable doubt, he considered it his duty to make the more serious diagnosis, reserving the right to revise it after a due period of observation. Cases of scarlet fever of such mild degree are so frequently encountered that this possibility must be borne constantly in mind, and therefore the wider recognition of the possible occurrence of a prodromal period in r  theln, lasting from two days, as he had repeatedly seen it, to five days, as noted in one of Dr. Miller's cases, offers a valuable point in diagnosis when the rash alone might be viewed with suspicion.

DR. MILLER said that r  theln more frequently than is supposed shows a definite prodromal stage. He also had never seen the scarlatiniform type of eruption referred to by Dr. Westcott, and considered that the rash most commonly resembled measles. The last case mentioned in his paper could easily have been mistaken for measles from the eruption, but the rapid subsidence of the symptoms and the known source of infection made the diagnosis clear.

Tuberculosis in Children. — That tuberculosis in children under ten years of age is a more frequent occurrence than is supposed usually, says Babcock (*Medical Standard*, June, 1904), is shown by statistics. According to Cornet, Simons, Schwer and Bolz, of 2,447 autopsies on children under ten years, dead of all diseases, 22.93 per cent. showed some form of tuberculosis. Mueller found 23.36 per cent. out of 426 autopsies. Jacobi states that in 1,045 autopsies tuberculosis was found in 14 per cent. In young children the primary seat of tubercle is in the bones, joints and lymph nodes, the lungs becoming affected eventually. The symptoms often are very deceptive, and it is important to weigh the findings carefully and to make an accurate clinical examination, especially of the lymph nodes of all regions, before making a diagnosis. Several cases are cited illustrating the necessity of very careful interpretation of symptoms.—*Journal of the American Medical Association*.

Current Literature.

PATHOLOGY.

Raw, Nathan: Primary Intestinal Tuberculosis in Children: Perforation of Ulcers. (*The British Medical Journal*, May 28, 1904, p. 1,245.)

Raw reports 3 cases in children under three years, which the autopsies showed to be primary intestinal tuberculosis and not secondary to lung infection. These 3 cases were the only primary ones he has found in 600 autopsies of patients dying from tuberculosis. In two of the children, the lungs were not affected at all, and in the third the lung infection was of very recent origin. He regards them as cases of bovine infection due to infected milk.

Hunter, William: The Occurrence of Primary Tuberculous Infection of the Intestinal Tract in Children. The Results of 5,142 Consecutive Autopsies. (*The British Medical Journal*, May 14, 1904, p. 1,126.)

Out of 5,142 necropsies performed at the Hong Kong public mortuary, of which number about 1,800 were in children under five years, Hunter found only 13 cases of tuberculosis of the intestines. Of these but 5 were primary in the intestines. These 5 cases were all in children under five years. The starting point of the disease was apparently in the follicles of the small intestine. The mucous membrane was studded with nodules, showing necrosis and caseation. Small ulcers were also present. The peritoneum was invaded in all 5 cases, and in 3 the mesenteric glands were affected.

Tuberculosis in various forms is very rife in Hong Kong. That of 5,142 necropsies held there, only 5 were of primary intestinal tuberculosis, seems to Hunter to bear out the statement of many writers that it is a rare disease.

He also believes that tuberculosis of the mesenteric glands is less common than is generally supposed; for in many necropsies where he found these glands enlarged and presenting the appearance of "tabes mesenterica," the microscope showed the absence of the tubercle bacilli.

Whether his 5 reported cases of primary intestinal tuberculosis were of bovine or human origin, Hunter does not attempt to say.

Poynton, F. J.: Remarks on the Infective Nature of Rheumatic Fever. Illustrated by the Study of a Fatal Case. (*The British Medical Journal*, May 14, 1904, p. 1,117.)

Poynton starts with the thesis that rheumatic fever is an infectious disease, and to prove his point, gives the results of a very careful study of a case.

In July, 1902, a delicate girl of nine years came to the out-patient department of the Hospital for Sick Children, suffering from chorea. The history and examination of the child showed her to have rheumatic endocarditis of the mitral valve with dilatation. It was her first attack of rheumatism, and there was no family history of the disease. She was received into the hospital wards and later sent to a convalescent hospital. The chorea was cured, but the heart lesion remained, so the child was kept under monthly observation.

In May, 1903, the mitral regurgitant murmur had disappeared, but signs of mitral stenosis showed themselves. In August of the same year, the child was readmitted to the hospital with a second attack of rheumatism. There was endocarditis which Hunter calls the malignant rheumatic form, but no signs of pericarditis. The lung signs were negative, the spleen was enlarged and tender, the liver was enlarged, and the urine was albuminous. The constitutional symptoms were marked. The child died suddenly ten days after her admission.

An autopsy was permitted and a pathological and bacteriological examination of the heart and some of the other organs was made. Permission to examine the brain was refused.

The mitral valve, the only one diseased, was much thickened and was covered with a blood clot, and on one portion of the valve were minute vegetations. The heart was generally enlarged. There was some pericarditis with clear exudation. The lungs showed patches of pneumonia and congestion. The spleen was enlarged and showed white infarcts. The kidneys were pale, the border line between cortex and medulla being indistinct. The liver was large and fatty. There was no suppuration.

The pericardial fluid, the clot from the heart, and a piece of the valve were placed in culture media of broth and milk. Another piece of the valve, covered with vegetations, was put in fixative. Cultures were taken from the lungs, kidneys, spleen, and gall bladder.

The bacterial results from the cultures were as follows:

(1) Pure cultures of the diplococcus were found in the tubes inoculated from the valve, the spleen, and the kidney.

(2) The culture from the lungs was not pure, but the diplococcus was present among other organisms.

(3) The tubes containing the pericardial fluid and the blood gave vegetative results.

One of the pure cultures was used immediately to experiment on rabbits and monkeys. The lesions of rheumatic fever resulted in every instance.

The rabbits died from arthritis, endocarditis, and pericarditis. One monkey died from the same lesions; the other survived a severe attack of arthritis accompanied with a mitral murmur.

Poynton comments at length on the facts brought out by this case, especially as to their practical bearing on the early diagnosis and treatment of rheumatism.

MEDICINE.

Pearson, S. Vere: Abdominal Pain in Acute Rheumatism.
(*The British Medical Journal*, May 14, 1904, p. 1, 120.)

Pearson calls attention to a symptom which he has found present in many cases of rheumatism in children. This consists of an abdominal pain appearing early in the disease. This pain is usually in the right or left hypochondriac region, or, on both sides, radiating either horizontally toward the median line or downward to the umbilicus. It is a pain of moderate intensity appearing at intervals, most frequently during exercise. The children describe the pain as "inside," and there is, as a rule, no tenderness on light or deep pressure. There is no accompanying nausea, and the pain appears not to be caused by any digestive disturbance, and is uninfluenced by the diet of the child. Pearson has found that most of the children say that the pain is not like ordinary "stomachache," although they cannot describe its character very accurately.

In a word, the nature of the pain is obscure, and the author does not attempt to explain its cause. However, he believes it to occur sufficiently often in rheumatism to put one on the watch for this disease when a pain of this character is found in the upper abdomen.

The usual treatment for ordinary colic does not relieve the pain. When other signs of rheumatism appeared and antirheu-

matic treatment was instituted, the abdominal pain generally disappeared. In several cases, aspirin was found to be very effective.

The author gives in detail the history of 4 or 5 cases of rheumatism in children, where this abdominal pain was an early and well marked symptom.

Feldstein, Zama : The Modern View as to the Etiology and Treatment of Eczema. (*Medical Record*, August 27, 1904, p. 336.)

In this article, Feldstein supports strongly the parasitic origin of eczema, and believes that constitutional causes play a very small rôle. He considers the only thing necessary to produce eczema is the parasite acting on a congested skin, the latter being due to a constitutional ailment or defect, or to some outside influence. He has found almost every case of eczema to be cured by the application of a sufficiently penetrating antiparasiticide. However, in a few cases, he resorts to constitutional treatment as an adjunct, but as an adjunct only.

In his opinion, many physicians do not get the best results from local treatment, because they use too bland remedies, which heal over the surface of the skin, but do not penetrate to the seat of the trouble. Thus the disease is liable to break out in a new place. Also, an animal grease should not be used as a basis for ointments as these feed the parasites beneath the surface, while the other constituents are acting superficially. He has had good results in using a mixture composed of juniperus oxycedrus, stavisacre, pinus silvestris and Eugenia caryophyllata, prepared without any animal fat.

Feldstein quotes freely from J. A. Fordyce and Malcolm Morris to support his views.

Heiman, Henry : Multiple Gonorrheal Periarthritis in a Child, Probably Due to Inoculation Through a Wound. (*Medical Record*, May 21, 1904, p. 815.)

This case is as follows:—A healthy boy, two and a half years old, injured the sole of his right foot, which injury was treated at home. Five days later he was taken ill with pain at the site of the wound in the foot, swelling and pain in both great toes and in the left wrist. His temperature was 101° F. The examination of the heart, lungs, throat, abdominal viscera, and urine, was negative. The wound in the foot was discharging seropus, but soon healed on proper surgical treatment. Antirheu-

matic remedies were given for the other symptoms. The pain and swelling of the wrist soon subsided, but the inflammation of the toes did not improve. Three weeks later suppuration of both metatarso-pharyngeal joints appeared. Gonorrheal rheumatism was suspected and surgical treatment instituted. Cultures were made from the suppurating joints which proved the presence of the gonococcus. Similar cultures from the conjunctiva, urethra, and rectum gave negative results. The boy recovered under the surgical treatment of the peri-arthritis.

The father of this boy was treated for gonorrheal urethritis, prostatitis and epididymitis eight days before the injury to the boy's foot. Previous to that the mother had had gonorrheal vulvovaginitis.

As no culture was made from the discharges of the original wound, this case cannot definitely be proved to be one of inoculation gonorrhea, but Heiman considers this probable.

SURGERY.

Jones, H. Macnaughton : Tuberculosis of the Female Genitalia in Children. (*Edinburgh Medical Journal*, August, 1904, p. 107.)

As regards age, Jones quotes Demme's report of cases at seven and thirteen months, and Murphy's statement that children have a primary tuberculosis manifested only in the external genitalia. Other authors report tuberculous vulvar tumors in a child of two years and ulceration in a child of four and one-half years. Tubal tuberculosis is quite rare, however.

Carpenter's method of combined rectal and bimanual examination has revealed genital tuberculosis in 11 cases ranging in age from fourteen months to nine years. In the youngest patient there was a hard mass in the umbilical and hypogastric regions with the right ovary adherent to it. He regarded the cases as secondary.

As regards diagnosis, Jones holds that (a) the most important thing is local examination of the vulva, vagina and portio-vaginalis, assisted by a bimanual examination of the uterus and adnexa under anesthesia; (b) a microscopic and bacteriologic examination of some portion of the affected tissues; (c) a similar examination of fragments from the uterine cavity after curettage; (d) the presence of tuberculosis in other organs; (e) the appearance of the ulcers; (f) duration and subjective symptoms.

Much information may be gained by recognition of tuberculosis of the pelvic peritoneum, which almost always accompanies similar disease of the genitals, and which may, according to Hegar, be detected on internal examination by nodules that are almost pathognomonic. These nodules are found chiefly on the posterior surfaces of the sacrouterine ligaments and frequently the tube has the form of a rosary with very hard nodules. A nodule in the pars uterina is a reliable sign of tuberculosis.

Murphy, John B.: Case of Tetanus Successfully Treated by Aspiration of the Cerebrospinal Fluid and Injection of Morphin-eucain and Salt Solution. (*Journal American Medical Association*, August 13, 1904, p. 460.)

This case of tetanus, in a boy of eight years, was consequent to a neglected wound of the foot. Five days after the injury trismus developed and later general convulsions. On his admission to the hospital the boy was anesthetized and the wound treated locally. Injection of antitetanic serum was tried with no apparent effect. Later lumbar puncture and withdrawal of the fluid were begun, and at the same time 3 cc. of a solution consisting of beta-eucain, morphin sulphate, sodium chlorid and distilled water were injected into the subarachnoid space. This treatment was continued at intervals for over a week, and the boy recovered. Murphy considers eucain to be much safer than cocain in these cases.

Marique: The Surgical Treatment of Meningitis. (*La Path. Inf.*, July 15, 1904, p. 145.)

The value of lumbar puncture is discussed in reference to its diagnostic and curative effect on epidemic cerebrospinal meningitis and meningitis of tubercular origin. As a diagnostic agent its importance has long been established. From a therapeutic standpoint the statement is made that repeated lumbar puncture is of marked value in the epidemic meningitis, but is without effect in the tubercular variety. The latter requires trephining with drainage of the subarachnoid space, incision of the dura, ventricular puncture or drainage. This, of course, is an extremely precarious undertaking, and accompanied frequently by numerous disappointments and many failures. However, in so far as the tubercular process may predominate in the meninges, it may be said that surgical interference here should be regarded with hope—especially in cases amenable to no other treatment.

HYGIENE AND THERAPEUTICS.

Shaw, Henry L. K.: **The Treatment of Scarlet Fever with the Moser Antistreptococcus Serum.** (*The Medical News*, October 29, 1904, p. 817.)

The author gives a short account of the experience in Vienna with Moser's serum. During the last four years all the severe cases of scarlet fever admitted to the Anna Kinderspital, in Vienna, have received the Moser serum with results which are claimed to be not less remarkable than those seen after the use of diphtheria antitoxin.

Moser profited by the experiments of Meyer and Petrusky and Koch, which had shown that streptococci passed through animals lose their earlier agglutination power with a certain serum, and that in the passage through rabbits the virulence of Marmorek's streptococci was increased toward rabbits, but decreased toward man. He did not attempt, therefore, to increase the virulence of his streptococci, but injected them as soon as obtained into horses. He injected some thirty different strains of streptococci and the serum that he obtains is, therefore, a true polyvalent one. It takes seven to nine months to produce a satisfactory serum and some horses never produce a satisfactory serum.

No preservative is used for the serum. When sufficiently potent, the serum, in a dilution of 1 to 250,000, should agglutinate the streptococci. The dose usually given is 200 c.c., and the only unpleasant result following its use is the serum exanthem. This, as in diphtheria, is often accompanied with fever, and it makes the children very uncomfortable. The custom at the Anna Kinderspital is to give the serum to the very severe and lethal cases. Marked improvement and recovery are claimed in many otherwise hopeless cases.

For more favorable cases, the results from the serum are soon manifest. The fever falls to normal without collapse, the pulse improves and the nervous symptoms rapidly disappear.

From November, 1900, to July, 1904, 228 patients were treated with the serum, many moribund and the majority severely ill. The mortality for the four years before the employment of this remedy was 14.5 per cent., and for the four years since its employment, 8 per cent.

Moser also uses the serum as a prophylactic measure in children exposed to scarlet fever.

Pospischill, of the Wilhelmina Hospital, and Bokay, of Budapest, after a limited trial, have both been favorably impressed with the effect of the serum. Escherich has become thoroughly convinced of its value, and is now an ardent advocate of the treatment.

Berry, F. May Dickinson: On the Physical Examination of 1,580 Girls from Elementary Schools in London. (*The British Medical Journal*, May 28, 1904, p. 1,248.)

These girls were examined on their passing from the elementary to the higher grade schools for which they had obtained competitive scholarships. Their ages ranged from eleven to fifteen years. Their general condition was on the whole good and compared favorably with girls subjected to a similar examination on the Continent and in America. Berry draws attention to several points of interest. Of the cases with defective hearing, only 11 per cent. were associated with enlarged tonsils or adenoids. Of the whole number of girls examined, only 10 per cent. had enlarged tonsils, whereas, the examination of the London boys of the same grade showed 34 per cent. On urine examinations nearly 10 per cent. showed albuminuria—the same per cent. as in the boys.

These girls appeared to be in good health and in no case did they show other signs of nephritis. Watch was kept for several years on a certain number of them, and their urine in most cases showed a gradual diminution of albumin, and their health did not deteriorate. Berry thinks these facts rather militate against the theory that albuminuria in the apparently healthy is necessarily an early sign of intestinal nephritis.

This examination of 1,580 girls also appears to show that the work in the London Board Schools had not injured their health.

Variot, G.: Gouttes de Lait et Consultations de Nourrissons. (*The British Medical Journal*, May 14, 1904, p. 1,125.)

Dr. Variot explains the workings of these two French institutions, and also aims to justify the former about which there has been some misapprehension.

The work of the Consultations de Nourrissons is confined to certain maternity hospitals in the larger cities. The infants born in these institutions are brought back at frequent intervals to be weighed and inspected, and proper milk is supplied to all who

are bottle-fed. Most of these babies, however, are breast-fed, the proportion being as follows:—60 per cent. are entirely breast-fed, 35 per cent. partly breast-fed and partly bottle-fed, while the remaining 5 per cent. are bottle-fed. With this high proportion of breast-fed infants, the mortality is correspondingly low.

The Gouttes de Lait, on the contrary, are dispensaries situated in the very poorest quarters of Paris and some of the other cities, where properly sterilized and prepared milk is supplied to the children of the lowest and poorest classes. Scarcely any of these infants are breast-fed, as their mothers either have no milk, or are obliged to work, leaving their babies in the care of others, many of whom are baby-farmers. Most of these babies are atrophic little beings and would nearly all die if left to the care—or lack of care—of the mothers or baby-farmers. These Gouttes de Lait supply the milk and watch over these babies, giving frequent instruction to those in charge of them. Naturally the death-rate is higher than with the infants of the Consultations de Nourrissons, where nearly all the children are breast-fed. Nevertheless, the deaths from all causes of the babies treated in the Gouttes de Lait are only 20-25 per cent., a good showing under the circumstances.

Simon, L. G.: Two Cases of Death from Suffocation Caused by the Fumes of Charcoal. (*Annales de Méd. et Chir. Inf.*, July 15, 1904, p. 486.)

Two children, age three and four years, were left to play in a closed room heated by a charcoal furnace. They were discovered in a few hours in a state of coma with feeble respiration and pulse. Camphor-oil and ether were injected and mustard baths given with the result that the children regained consciousness and were apparently comfortable. The following day dyspnea appeared and became so intense as to require tracheotomy. Relief followed instantly. In twenty-four hours dyspnea reappeared, with all the symptoms of a capillary bronchitis. All means of relief were useless, cyanosis was marked and death followed shortly. Both cases followed practically the same course and autopsy showed identical lesions: an acute inflammation of all the mucous membranes, intense conjunctivitis, nasal catarrh, acute laryngeal edema and an acute purulent capillary bronchitis due to the irritating volatile substances. The symptoms resemble in some degree those of membranous croup. These cases are very rare.

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Original Communications.

CEREBROSPINAL MENINGITIS.*

BY FRANCIS HUBER, M.D.,

New York.

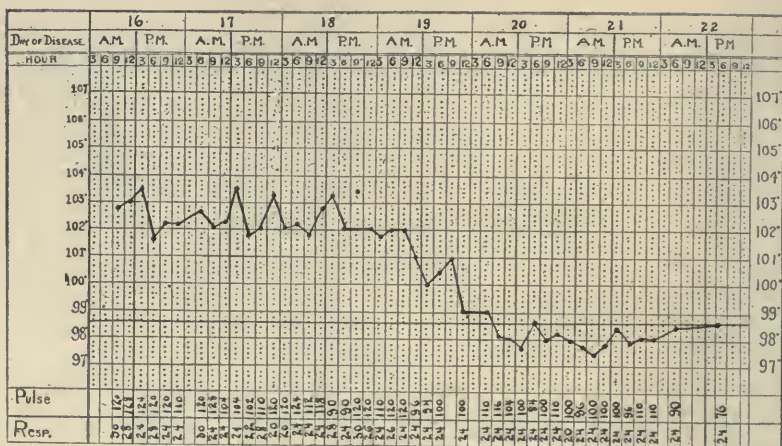
A retrospective consideration of the salient features of cerebrospinal meningitis, based upon a study of 100 cases, observed during the epidemic of 1904, may not be without interest at the present time. No detailed statistical report will be given; the clinical features only are discussed in this article. A study of 60 cases (three-quarters of these were under fifteen years of age) has been presented in the report of Gouverneur Hospital; the others were observed in the Children's Wards of Beth-Israel and Roosevelt Hospitals.

In the first case coming under observation at Beth-Israel Hospital, January 6, 1904, and in but two others, a history of a prodromal period was obtained. There were malaise, headache, loss of appetite, pains in the bones, chilliness and slight rise of temperature.

The invasion in the others was sudden, in many the exact hour was given. Two or more of the following symptoms were noted: Chills, or chilly feelings, more or less fever, convulsive movements or general convulsions, twitchings of a group of muscles or limb, vomiting more or less severe, headache, pain and tenderness of the muscles with rigidity of the back of the neck, irregular pains in the joints or other parts of the body, nasal catarrh or conjunctivitis, restlessness, sleeplessness, active or passive delirium, prostration, peculiar pallor with sunken eyes and greater or less degree of apathy, stupor or even coma.

The initial symptoms do not, as a rule, give us a clue to the subsequent course. We have seen cases beginning with high temperatures, coma and other evidences of intense infection, recover

* Read by title before the American Pediatric Society, Detroit, Mich., June 1, 1904.

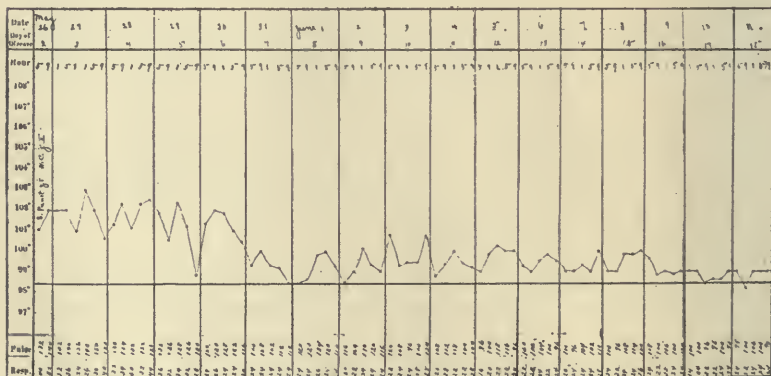


TEMPERATURE CHART I. MILD TYPE.

in a short time and leave the hospital in a fortnight. Such a case was that of which Temperature Chart I. is a record.

History.—Benj. T., nine years old. Onset sudden, with severe headache, vomiting, delirium, restlessness, stupor, etc. Black vomiting on the second day; incontinence of urine and feces. Leukocytosis, 26,000. On the third day 15 cc. of fluid escaped on lumbar puncture, showing positive diplococcus. Herpes on the fifth day. On the day following lumbar puncture there was decided improvement in the general symptoms. The case ended in complete recovery, although the onset was severe.

Another example of the mild type of the disease is shown in the Temperature Chart II.



TEMPERATURE CHART II. MILD TYPE.

Temperature Chart II.—Philip M., three and one-half years old. Onset with headache, vomiting and restlessness. *Condition on admission* (thirty hours from the onset), unconscious, quiet; slight pallor. Pupils small and inactive; neck rigid; Kernig's sign present. Temperature 101° F.; pulse, 132; respiration, 40. Numerous petechias on body. *Complications:* Hematoma on dorsum of right hand, appeared on the third day, and resolved in about two weeks. Abscess in lumbar region following hypodermoclysis, ten ounces of saline being injected on the second day. Lumbar puncture on day of admission gave one dram of turbid fluid; diplococci present.

Remarks.—The patient became conscious and irritable on the third day; on the fifth day there were twitchings of the left side of the face and the left arm. On the sixth day the pupils were normal and there was but slight rigidity of the neck, though Kernig's sign was marked, and, in fact, persisted for about three weeks. There was steady improvement and the temperature remained low after the sixth day. The pulse was from 100 to 150, up to the sixth day; after that, 90 to 124. On the nineteenth day the temperature fell to 97° F.; from then on, until the thirty-fourth day, it was practically normal.

On the other hand, a comparatively mild onset was often followed by a more or less prolonged convalescence or a fatal termination. In the words of J. Lewis Smith, "there is probably no disease which falsifies the prediction of the physician more frequently than cerebrospinal fever."

Chilly feelings were common early symptoms in children three to four years of age and older. Later on in the disease irregular chills and chilly sensations occurred at irregular intervals in many cases. They were of no prognostic import, for some of these patients eventually recovered.

Pain in the head (mostly frontal, at other times occipital, parietal or general) was a constant and distressing symptom. Even when unconscious, from time to time, there would be a cry: "Oh! my head." Pain, tenderness or tenderness and retraction of the posterior cervical muscles (in mild cases a resistance to the forward movement without interfering with rotations) was an early and pathognomonic sign.

In severe cases the vertebral muscles were involved, causing orthotonus more commonly than opisthotonus.

"The usual position of the patient in bed, in a typical or

marked case, is with the head thrown back, the thighs and legs flexed, with or without forward arching of the spine. The muscular retraction and rigidity continue from three to five weeks, more or less, and abate gradually; occasionally they continue much longer."—(J. Lewis Smith.)

In several of the Gouverneur Hospital patients the condition persisted for three to four months. In 1 case (still under treatment with temperature) more than five months have elapsed, from the time of the first appearance of contractions. Two chronic cases of over five months' duration still remain in Beth-Israel. The symptoms, without doubt, are due to the presence of a serous effusion in the ventricles and subarachnoid space.



FIGURE I. (DORA C.)

An excellent example is presented in the case of Dora C., one year old. (Figure I.)

Any attempt to move the contracted muscles induced severe pain. To develop Kernig's sign (present some time or other in nearly all cases)

was painful and increased the restlessness in many instances. Pain along the spinal nerves, changing from one part to another, was frequently observed, as was hyperesthesia of the skin. In 4 of the Beth-Israel cases the abdominal pain was very severe and gave rise to a good deal of complaint. Later on insensibility and numbness followed the hyperesthesia and painful stage.

General convulsions were common in children at the onset, and later on in severe or fatal cases. Localized (convulsive) seizures were noticed about the face in particular; less often one extremity or one-half of the body was involved. In several there was difficulty in deglutition, which, however, was of short duration, disappearing within thirty-six to forty-eight hours, and probably due to muscular paresis. Strabismus, ptosis and loss of power of the sphincters of the bladder and rectum with incontinence of urine and feces, were frequent. Monoplegia and hemiplegia have been observed.

Conjunctivitis and otitis (catarrhal or suppurative) were common. The process is probably due to the extension of the infection from the nasal mucous membrane, as the characteristic diplococcus has been detected in the secretion from the eye, nose and ear. Furthermore, serious affection of the eyes, of the internal structures of the ear, with loss or impairment of sight or hearing, may be occasioned by central causes in the brain or special nerves.

Photophobia and contracted pupils, present in the beginning, were followed by dilatation and absence of pupil reflex in the later stages, with the increase in the intracranial pressure. Inequality



FIGURE II. (WILLIE G.)—EMACIATION, WITH RETRACTION OF ABDOMEN. TEMPERATURE CHART V. ON PAGE 100 REFERS TO THIS CASE.

of the pupils, hippus, feeble response to light were quite frequent. Nystagmus was fairly common.

Hearing, very acute in many cases at the outset, became dull, or was, perhaps, entirely lost later on.

Prostration, with general relaxation, was an early evidence of intense infection. In the later stages it was due to exhaustion, or the result of trophic disturbances. Emaciation, with retraction of the abdomen, was a common symptom in chronic hydrocephalus following cerebrospinal meningitis. (Figure II.)

Restlessness, sleeplessness, delirium, apathy, tremors, stupor and coma occurred early or late, or were present to a greater or less extent throughout the progress of the disease.

The nervous manifestations were mild or pronounced and violent, necessitating restraint at times.

The mental condition varied in individual instances. In some

we noticed slight drowsiness, a sleepy state, apathy, varying degrees of stupor and finally profound coma.

Delirium may be mild or violent and associated with extreme restlessness and irritability. Now and then the sensorium is involved only for a short period. Coma may persist for a long time, it may be followed by recovery or there may be more or less improvement succeeded by a relapse; these phases may be repeated time and again. Finally, death takes place.

Many of the older children, as soon as the acute stage with its pain and hyperesthesia had passed, appeared to be quite contented in their "coiled up" position: when asked, "How do you feel?" they would answer, "I am better" or "I feel well"; although the temperature and muscular rigidity belied the words at the time.

Vomiting, as an initial symptom, was rarely absent. Later on, in rare cases, it was present as an evidence of nephritis; more commonly it was due to the inflammatory processes at the base of the brain or was symptomatic of chronic hydrocephalus. At times it was a very distressing and dangerous symptom. When the muscles of deglutition were involved, there was inability to swallow, with regurgitation of whatever was taken. In some cases of the fulminant type, blood was vomited. In the case of Benny I., recovery occurred, though he had vomited quite an amount of gummy fluid.

The appetite is generally poor, the tongue is more or less coated, now and then covered with a thick white fur. At times sordes covered the teeth and tongue, not infrequently the organ was bright red or glazed.

The bowels are generally constipated. In the prolonged cases, particularly with chronic hydrocephalus, more or less incontinence was present.

Though it is claimed that the spleen is enlarged in the acute stage, it was difficult to verify the statement. The general hyperesthesia, complaints of abdominal pains and tenderness with an increase in the general restlessness and irritability, caused by any attempt at careful palpation of the abdomen, made it impossible to examine with the necessary care.

Breathing was but moderately accelerated. Cheyne-Stokes and sighing respiration were present at times. Pulmonary edema or pneumonia as a complication gave rise to characteristic rapid and labored action. Evidences of respiratory failure from central

causes were observed now and then, and were the direct cause of a fatal issue.

The pulse was slow, as a rule, in adults; in children, on the contrary, it was extremely rapid. The characteristics observed in tuberculous meningitis were not found in the acute forms of cerebrospinal meningitis.

There is nothing pathognomonic about the fever. As shown on the accompanying charts, the temperature ranges and varies within wide limits. A case running a low grade is often as dangerous as one with a considerable elevation. The temperature may be irregular; remissions and recrudescences were of frequent occurrence. No prognostic value can be attached to sudden drops. Subnormal temperatures were frequent in chronic cases.* Erotic symptoms were of common occurrence.

Skin eruptions were observed in a fairly large number of patients. A more or less diffuse mottling appeared upon the face, and other parts. It was noticed particularly about the ears, forearm, hand and lower extremities. At the outset the skin was of a peculiar ashy pallor, with dark circles about the eyes.

In restless patients, the integument on the exposed parts, elbows, trochanters, etc., was covered with minute fine punctations, more or less diffuse, resembling superficial abrasions. In others, parallel hemorrhagic streaks due to scratching with the finger nails were found.

A "tâche cérébrale" was readily evoked in the majority of instances. Irregular areas of congestion due to vasomotor disturbances, occurred upon the forehead, face and other parts of the body.

Petechiæ occurred early and were noted in about one-third of the patients. Ecchymotic spots and purpuric plaques were seen in the severe type and fulminant cases. Now and then petechiæ were observed upon the conjunctivæ, in other cases larger areas of congestion were present independent of, and not associated with, conjunctivitis. In a few chronic cases successive crops of petechiæ were found later.

"Cutis anserina" was not uncommon.

Herpes upon the lips, *alæ nasi*, cheeks, auricular and post-auricular region occurred frequently about the third or fourth

* See Charts Nos. III. and VI. for decided drops in temperature. In Chart No. V. there was from the thirty-fifth to the fifty-seventh day continuous sub-normal temperature.

day. In one patient, a boy of eight years, in addition to the crop on the lips, a large group appeared over the sternum (as shown in Figure III.). In 2 cases, herpes were present on the fingers.

Roseola, urticaria and blebs over the tip of one or more fingers, filled with bloody serum, were seen now and then. Drug eruptions, due to bromids, phenacetin or other coal-tar products occurred in isolated instances.

Cracked condition of the skin about the joints, bed-sores, branny desquamation, similar to that which occurs in chronic disturbances of nutrition in general and desquamation of the hard

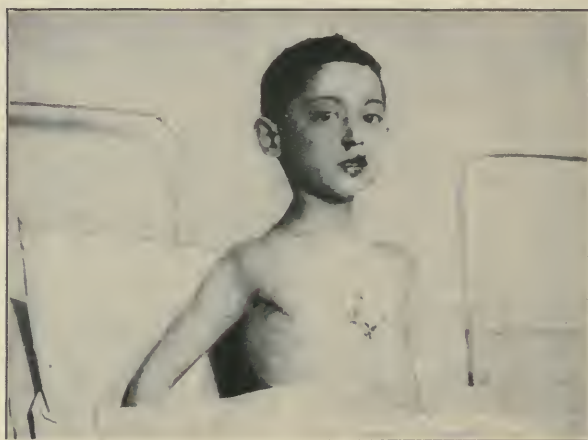


FIGURE III.—HERPES OF STERNUM, LIPS
AND ALA NASI.

epidermis of the soles and palms in large flakes, were met occasionally in the protracted cases. Picking at the lips and nares, giving rise to bleeding and ulcerations, was an annoying feature in many cases. A chronic case at the Beth-Israel Hospital, presented an abnormal growth of hair over the extremities and body (Figure IV.) during the two and a half months preceding discharge from hospital. The disease lasted six months and resulted in chronic hydrocephalus with persistence of the "curled-up" position.

Blood examinations were made in nearly all cases. Leukocytosis, principally of the polymorphonuclear cells, varying from 18,000 to 40,000, was found. The condition persisted even in the protracted cases. In 3 cases numerous lymphocytes were detected.

The characteristic diplococcus was found in nearly all cases.

We were able to detect the germ at a very early period, in the cerebrospinal fluid. In one, within eight hours from the onset; in others, within ten or twelve hours. The microorganisms were readily found in the smears in the beginning of the disease, in the chronic cases sometimes only after cultures were made. Thus they have been found as late as the 104th day.

It is claimed that the disease is more common among the poor and in crowded quarters; all sections may be invaded, however.

Our hospital cases were brought in from the densely populated tenement districts. The past winter was exceptionally severe; pneumonia was unusually frequent with a high mortality; times were hard and the rooms were tightly closed. The air was impure in the close apartments, the sanitary and hygienic measures sadly



FIGURE IV. (JAKE)—CHRONIC CEREBROSPINAL MENINGITIS;
ABNORMAL GROWTH OF HAIR OVER BODY AND EXTREMITIES.

neglected. With the advent of warmer weather, the epidemic appeared to lessen.

The better sections did not escape altogether, a number of cases were seen in consultation under favorable surroundings.

It is generally stated that the specific poison is not transmitted by contact from person to person. It does not seem to spread from one case to another. It usually attacks a number of people at different places, and it is not possible to trace any connection between successive cases. But rarely do we find more than one affected in the same house or family. To this, however, there are numerous exceptions, at least during this present epidemic. More than a dozen instances have come under personal observation, and others have been cited by colleagues in which two were attacked in the same family. In several others, three were taken down in a household, not always at the same time, however.

Our records show that multiple cases were occasionally met with in the same house.

not encountered in our series. Chronic hydrocephalus, blindness, loss of hearing or speech, various degrees of mental impairment and different forms of paralysis were met as sequelæ. Cervical adenitis without suppuration was seen a number of times at the Beth-Israel Hospital. In only one instance, in an adult, parotitis was present.

Cases of chronic hydrocephalus were quite frequent and were characterized by periods of improvement, followed by a return of the unfavorable symptoms. Progressive emaciation, sometimes quite rapid, irregular temperature, alternating coma and delirium, incontinence of urine and feces during the relapse, spells of vomiting, dilated pupils, marked retraction of the abdomen (as shown in Figure II., Willie G.), are the prominent symptoms. In addition, headache (paroxysmal in character) and convulsions at times were observed in several cases at Gouverneur Hospital.

The youngest child in our hospital service was about six months of age; in private several were seen thirteen, fourteen and fifteen weeks old. Recovery was observed even at this early age. Chronic hydrocephalus was very apt to follow, as a sequel.

Jacob J., eight months old, had been ill for three and one-half months. The onset was sudden, the subsequent course irregular, but progressive, at times some improvement, then relapses. Admitted to the hospital on March 23d, he died the next day. (Figure V.)

		P.	R.	T.
March 23d—12.45	P.M.....	?	48	95°
	3 P.M.....	88	48	94°
	6 P.M.....	112	48	95.6°
	9 P.M.....	104	32	95.8°
March 24th—12	P.M.....	100	44	104.8°
	3 A.M.....	152	36	102°
	6 A.M.....	148	36	100°
	9 A.M.....	112	32	97.4°

The photograph shows the emaciation, large size head, and marked degree of retraction, etc. Shortly before death the occiput and sacrum were in apposition. No autopsy. Postmortem puncture allowed escape of over one-half pint of cerebrospinal fluid, in which the meningococcus was still found.

Success attending the treatment is limited, for the actual cause has not been discovered. The source of infections, and the

method of transmission are unknown, nor are we familiar with the manner in which the organisms are eliminated from the body. We are not in possession of any data which enable us to resort to



FIGURE V. (JACOB J.)—CHRONIC HYDROCEPHALUS, ADVANCED STAGE, EXTREME OPISTHOTONUS.

preventive measures, to adopt proper prophylactic measures. When we consider the nature of the lesions, presented by the disease, and bear in mind the intensity of the initial infection, we must conclude that the object of the physician is prevention rather than cure. It is true, the *diplococcus intracellularis meningitidis*

has been discovered. As the organism is frequently detected in the nasal mucous membrane, it is inferred that the infection enters through the nasal lymph channels, and by them is conveyed to the meninges and subdural space. The possibility of the blood carrying the microorganisms must not be lost sight of.

Blood cultures made by competent bacteriologists have revealed the germ in the circulating fluid. Little is known of the life history of the diplococcus, outside of the body, and many interesting problems are still unsolved. It is to be hoped that the mysteries of the mode of infection will be elucidated. This much dreaded disease of childhood, and early adult life, cannot be blocked at the fountain head, until the causes and the manner in which it becomes diffused among the well in an epidemic form are discovered.

In the discussion of the value of any plan of treatment of cerebrospinal meningitis of the epidemic variety, several cardinal points must not be lost sight of, viz.: (a) the great irregularity in the clinical course of the infection; (b) the high rate of mortality in most epidemics.

The malignant cases (fulminant or apoplectic type) die within twenty-four to seventy-two hours, some after five to twenty hours' illness. In such, our therapeutic measures are of little avail. In Gouverneur Hospital, one of our patients died within fifteen hours. In addition to the ordinary form there are anomalous types. The attack may be ushered in with severe symptoms; in a day or two they subside and convalescence is rapid. Then, again, there are certain mild cases, in which headache, nausea, and more or less cervical pains, stiffness or rigidity are noted. The fever is moderate or absent, and a diagnosis is only possible during the existence of an epidemic.

In the intermittent form, we have exacerbations of fever, recurring every day or every other day. The curve being of an intermittent or remittent character.

In the chronic variety the attack may be protracted for several months. There is intense marasmus, a series of recurrences of the fever, and a complex symptomatology attributed to abscess of the brain, or chronic hydrocephalus.

The clinical course varies, as we have observed, within wide limits from a few hours to four months or over. There is a case in Gouverneur Hospital with irregular temperature after 150 days' illness. Osler writes: "The high rate of mortality which has ex-

isted in most epidemics indicates the futility of the various therapeutic agents which have been recommended." The present epidemic is no exception. The mortality was high, the percentage of malignant cases large. Strong robust children were attacked more frequently than were the puny and weak. The greatest mortality was in children under five years of age. The larger proportion died within the first five days. Several cases in infants twelve, fourteen and fifteen weeks old, seen in consultation, recovered from the meningitis, though chronic hydrocephalus followed as a sequel.

Exacerbations and remissions were frequently observed after apparent convalescence; unexpectedly a recrudescence or a relapse would follow a short period of improvement in the general symptoms. Unfortunately, these mishaps could not be foreseen or guarded against.

Each case must be judged by itself. The irregular and variable course of the disease in different patients leaves us in the dark as to the relative success of treatment. It is not in our power to destroy the germ, nor can we at present counteract its toxic effects.

The strength of our patients must be kept up by proper nourishment and careful, skilled nursing. This is of the utmost importance, particularly in the protracted cases.

The symptoms in general must be treated as they arise. Whenever possible the patient should be isolated. Rest and quiet, for both the mind and body, are essential.

Potassium or sodium iodid given from the inception of the attack, or perhaps not until a later stage, has been advocated by various authorities. In the *Medical Review of Reviews* (May 25, 1904) the use of the iodids is insisted upon. The assertion is made that under their continued administration all the products of inflammation finally disappear, the mortality being small. In one of our large hospitals, the plan was given a thorough trial. The remedy was used in increasing doses over long periods. Blindness and deafness persisted in some of the cases that recovered. The fatality was about the same. Ergot has its ardent supporters. Morphia, codeia or opium is of material benefit in controlling the pains, restlessness, etc. In severe cases morphia hypodermically is absolutely necessary. Bromids have been employed for a similar purpose. Hot packs or baths (at 90°, 95° or 98°), with or without mustard, relieve the irritability and restlessness.

ness and frequently promote a quiet sleep. The muscular spasms, retraction of the head and rigidity in general are greatly lessened by the bath. Leeches had been applied before admission in many without material benefit.

Phenacetin in small doses, repeated at intervals relieves headache and pain. Ice-bags to the head and in some cases to the spine, were resorted to as a routine measure. Ointments (Credé, mercurial, etc.) were employed without any appreciable effect.

It may be well before entering upon a discussion of lumbar puncture to refer incidentally to the lesions met with in fatal cases. We may have an acute inflammation of the meninges with more or less involvement of the superficial layers of the brain and cord.

The pia is infiltrated, serum, fibrin and pus are present in varying proportions and quantities in different instances. In children, in particular, the ventricles contain a smaller or larger amount of fluid.

The cortex may be edematous, softened or infiltrated with pus cells.

In some, the pia is congested, or there is an increase in cells, without any exudation.

The inflammation may involve the cranial and spinal nerves, the most marked lesions being in the second, fifth and eighth nerves.—(Delafield.)

In a personal communication, Dr. O. Schultze, who, as coroner's physician, has made a number of autopsies in the rapidly fatal cases, says: "In these cases I am impressed by the evident amount of compression of the cortex, apparently due to increase of fluid in the ventricles. It seemed to me that this compression was the direct cause of death in these cases, rather than the toxemia from the infection; basing my opinion upon the short duration of the disease, temperature and moderate or slight development of degenerations in such organs as heart muscles, kidneys and liver."

To recapitulate, in a certain proportion (*a*) we find an intense congestion of the pia and blood vessels, without any exudation. In others (*b*) a variable amount of serum, pus or fibrin is found. In children, in particular, the lateral ventricles are distended, more or less, and an excess of fluid is present in the subdural space.

Aside from any fault in the technique of lumbar puncture, a

dry tap will result if the former condition (*a*) obtain. In the latter (*b*), by means of this simple procedure, we are enabled to gain a definite knowledge of the character of the inflammatory products; whether serous, serofibrinous, seropurulent or purulent. Sometimes a plug of fibrin occludes the needle or the communications between the lateral ventricles and the subarachnoid space may be shut off by adhesive inflammation. In such circumstances, the puncture is negative.

In serous meningitis, lumbar puncture is of the greatest possible benefit, as shown in the reports of cases cured. When fibrin and pus are present, plus toxic symptoms, the problem is more complicated. It is no longer a simple question of the removal of fluid. We are dealing with a toxemia in addition to the exudation of fibrin, pus, etc.

More or less serum may be readily removed; fibrin, pus and other products of inflammation remain. The toxic symptoms are not materially influenced by the procedure.

The amount drawn off varies from a few drops, enough for a microscopic examination, to 8, 10 or 14 drams. The fluid may be clear, more or less turbid, yellowish, greenish, or distinctly purulent. At times it escapes drop by drop, or more or less rapidly in jets or a stream. Only when it was thought that the needle was occluded by a plug of fibrin did we venture to resort to gentle aspiration with a hypodermic syringe.

Lumbar puncture was resorted to in quite a number of cases. The results have been disappointing from a therapeutic point of view. As the result of a wide and varied experience, the writer is forced to take a conservative view and endorses fully the position taken by Jacobi.

"Lumbar puncture, mostly between the third and fourth lumbar vertebræ, has resulted in facilitating a diagnosis in many instances, and in temporarily relieving some symptoms; those of congestion, edema, pressure, coma, but rarely aided in accomplishing a cure."—(*Therapeutics of Infancy and Childhood*. Page 278.)

The brilliant results reported to have followed the use of lysol injections have not been realized in our hospital cases, in which this method has been tried. After using the plan a few times, with indifferent results, it was discarded.

In a series of early cases, presented in detail in the Gouverneur Hospital Report, the results obtained by *early lumbar puncture*

and *hypodermoclysis* are given. Normal salt solution at the temperature of the body was injected in the hope of diluting the toxins and possibly favoring their elimination. The results were rather encouraging.

The following case is interesting, inasmuch as it was one in which permanent drainage was accidentally established:

Michael R., four years old (brother died of meningitis on May 10, 1904) was admitted into the hospital six hours after initial symptoms of vomiting and headache.

He was in coma, neck rigid, *tâche* marked, temperature 102.4° F. Lumbar puncture at 8 P.M. (twelve hours from onset), 5 c.c. turbid fluid removed, containing numerous diplococci. From this time on (May 10th) the puncture drained more or less continuously and slowly (drop by drop). Nineteen days later the puncture had apparently closed, and an area of redness and swelling appeared over the site.

May 30th, a slight incision permitted the escape of considerable turbid fluid. A sanious discharge for twenty-four hours followed, upon making a larger incision the next day. Under the application of wet dressings, the inflammatory symptoms referred to above quickly disappeared. From this time on until death, June 18th, cerebrospinal fluid containing diplococci continued to discharge.

From May 29th, basal symptoms appeared, the child was unconscious, emaciated rapidly; obstinate vomiting set in and death occurred on the fortieth day. Practically the drainage was continuous, interrupted by occasional closure of the opening for brief intervals.

Throughout the course of the disease, the flow was seropurulent in character, containing numerous polymorphonuclear cells with diplococci. At no time were there any evidences of a mixed or accidental infection of secondary origin.

The suggestions to trephine the skull, do a lumbar puncture and wash out with a normal salt solution could not be adopted, as we could not obtain the consent of the relatives, in what we deemed were appropriate cases.

In this connection the writer takes pleasure in presenting briefly a *résumé* of some cryoscopic examinations of cerebrospinal fluid removed by lumbar puncture made by Dr. J. H. Bailey (Senior house physician, Beth-Israel Hospital).

Normally, the point of coagulation of serum is about —.56° C.

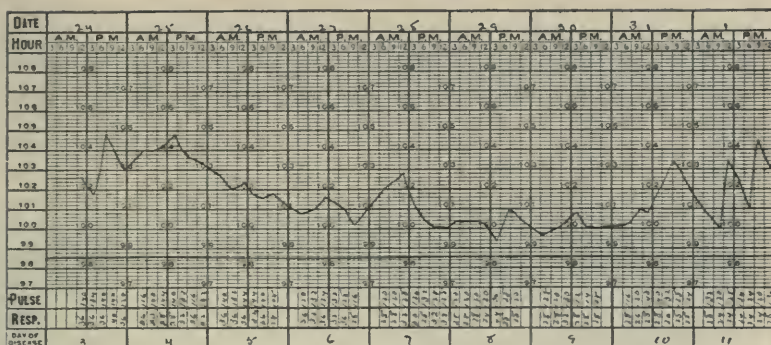
That of cerebrospinal fluid is lower; it varies between $-.72$ and $-.78$. In diseased conditions it varies between $-.56$ and $-.74$, and in a large majority of cases between -0.60 and -0.65 .—(Chavasse and Maher, *American Journal of the Medical Sciences*, May, 1904, page 925.)

The following is a brief report of Dr. Bailey's studies:

The limits of the freezing point (in a study of 69 cases) were $-.815$ and $-.500$. The vast majority of cases, however, 79 per cent., ranged from $-.64$ to $-.52$, a variation of only $-.12$. The average point was $-.575$. The greater part of the depression of average freezing point was $-.575$. The greater part of the depression of the freezing point is due to the sodium chlorid content. The freezing point varies not only in specimens from different cases, but, also, in specimens from the same case at different times. The depression of the freezing point gives no information as to the prognosis.

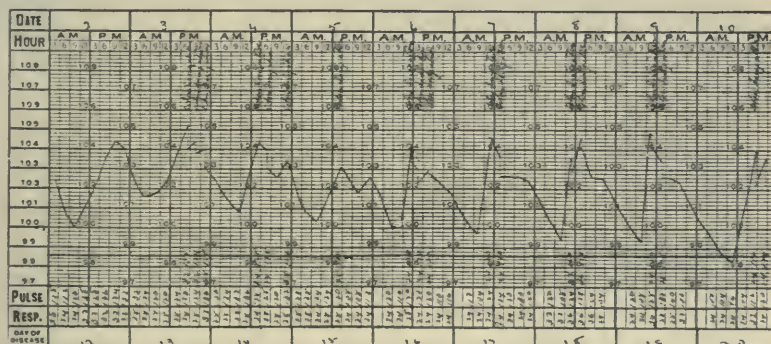
The following temperature charts illustrate certain phases of the disease. Charts IV. and VI. show the irregular type of temperature with decided drops and sub-normal temperature, followed by recovery. Chart V. shows the course of chronic cerebrospinal meningitis followed by chronic hydrocephalus.

Temperature Chart IV. Irregular Type.—Max M., two and one-half years old. Onset sudden (fever, extreme restlessness, delirium, severe pain in head and neck). Petechia. Noisy when admitted, extremely restless, comatose. Noisy for four days, then became quiet—consciousness returned gradually. Somewhat apathetic for weeks, and very irritable when spoken to. From tenth day on temperature intermittent in type. From twenty-fifth to twenty-seventh, subnormal, at times 96.95° ; twenty-eighth and twenty-ninth, recrudescence, then low and subnormal, followed by exacerbation on thirty-third day (vomiting, increased headache, moderate coma), lumbar puncture followed by decided improvement next day. Subsequent course favorable. Remission from latter part of seventh day to latter part of tenth day. Pus from abscess of thumb showed some diplococci: no diplococci intracellularis found. Drop in temperature. Remission thirtieth to thirty-third day. From June 29 to July 6, the temperature was normal.



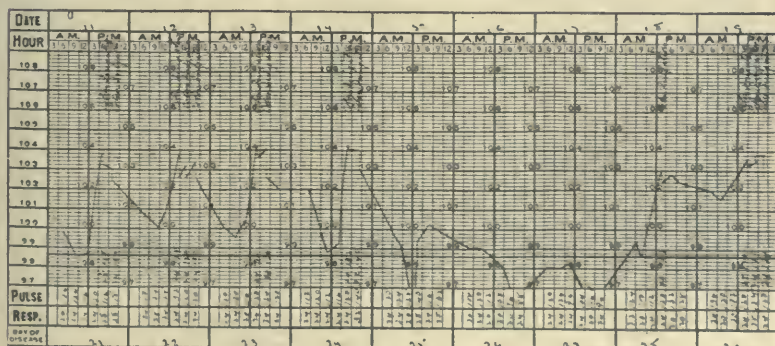
TEMPERATURE CHART IV., 1.

Some diplococci, not intra-cellularis, found in pus from abscess of thumb.



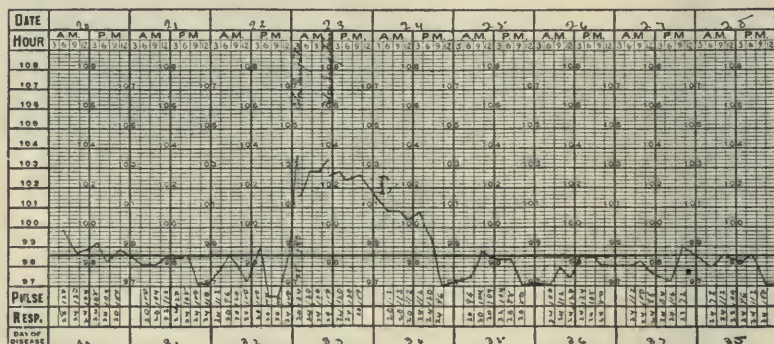
TEMPERATURE CHART IV., 2.

Lumbar puncture drew off fluid free from cells.



TEMPERATURE CHART IV., 3.

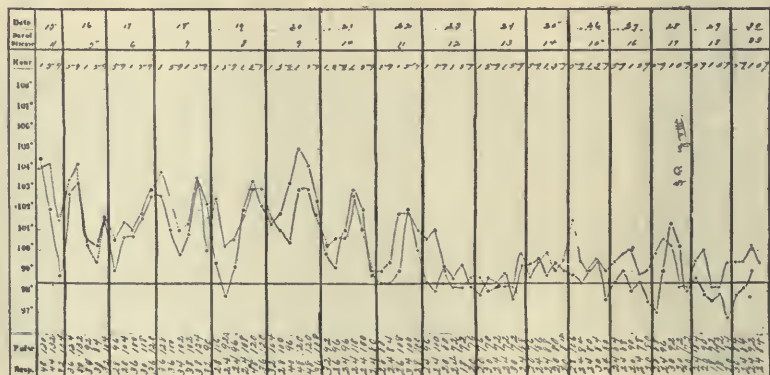
On the twenty-fourth day the 6 P.M. temperature was 104.2° F., on the twenty-fifth day at noon, it was 96° F., a fall of 8.2° F. There was then a remission of the fever until the twenty-eighth day.

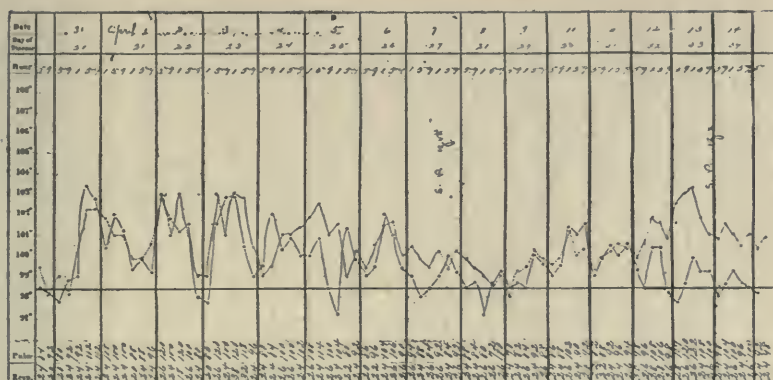


TEMPERATURE CHART IV., 4.

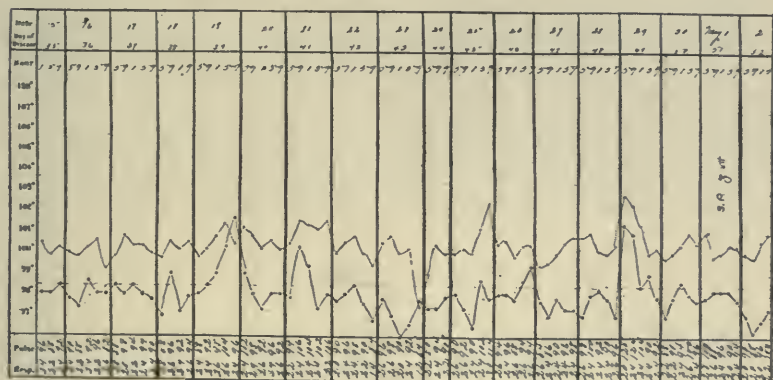
Remission from the thirtieth to the thirty-third day. On the thirty-fourth day the spinal fluid showed meningococci.

Temperature Chart V.—Willie G., six years old. Prolonged course ending in chronic hydrocephalus, with death on the one hundred and nineteenth day. The marked emaciation and retraction of the abdomen are shown in Figure II. (page 85), which is from a photograph of this patient.

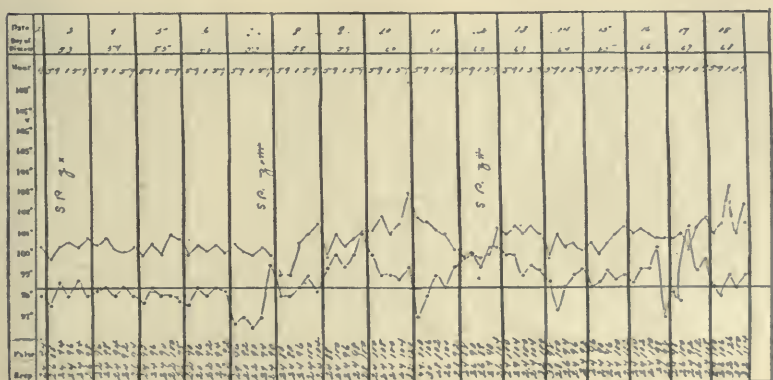




TEMPERATURE CHART V., 2.

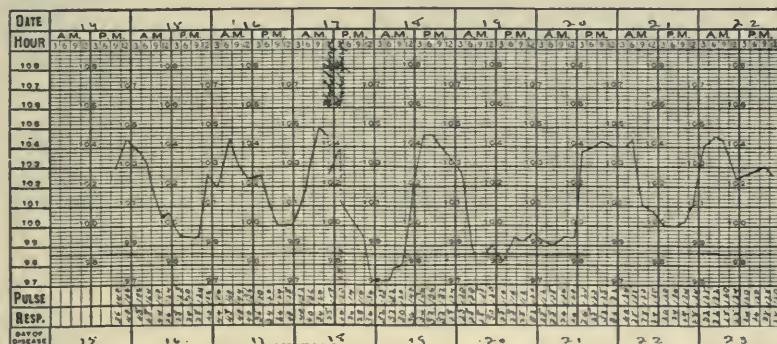


TEMPERATURE CHART V., 3.

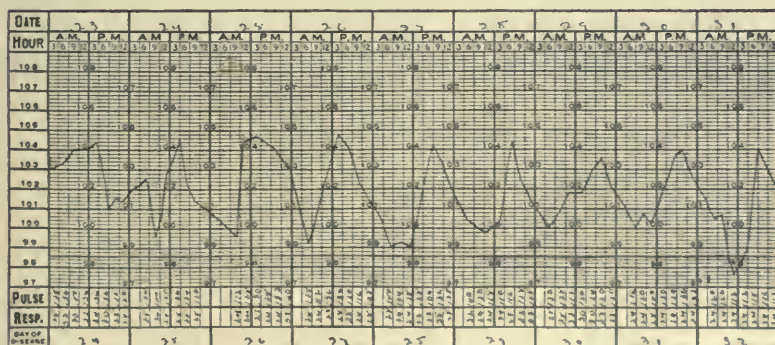


TEMPERATURE CHART V., 4.

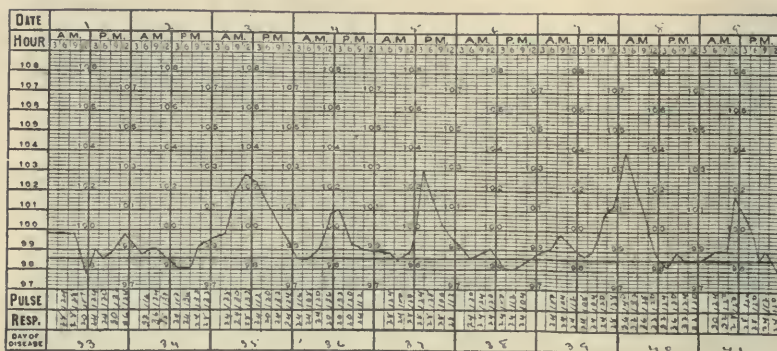
Temperature Chart VI.—Shows an irregular type of temperature, with recovery. The patient, Rachel A., was three and one-half years old: the onset was acute and the child was admitted to the Roosevelt Hospital on the fourteenth day of the disease. There was double metastatic choroiditis on the seventeenth day, with resulting loss of vision.



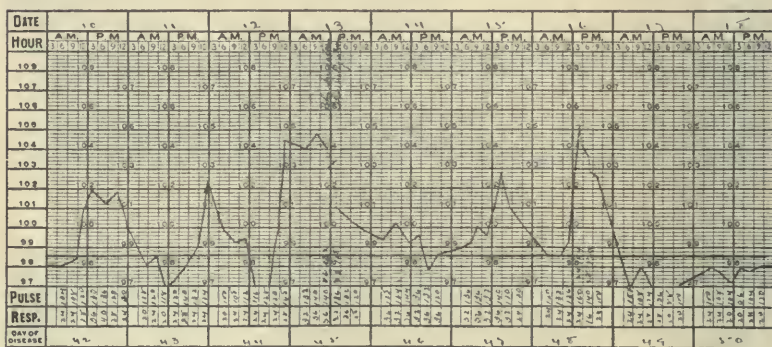
TEMPERATURE CHART VI., I.



TEMPERATURE CHART VI., 2.

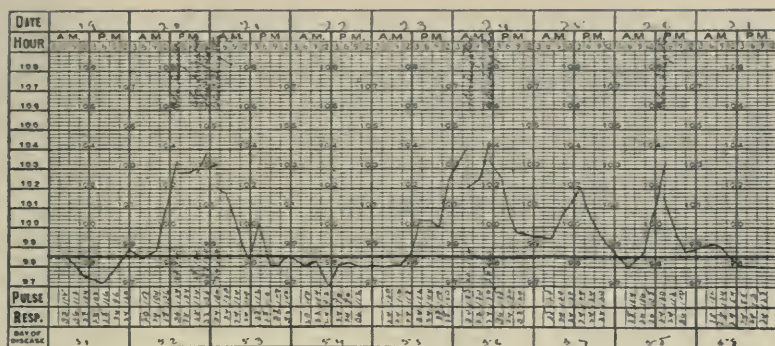


TEMPERATURE CHART VI., 3.



TEMPERATURE CHART VI., 4.

On the forty-fourth day, at 6 P.M., the temperature was 96° F.; at noon on the forty-fifth day it was 104.4° F., a rise of 8.4° F. On the forty-eighth day the 3 P.M. temperature was 105.2° F., on the forty-ninth day at noon it was 95.8° F., a fall of 9.4° F. in less than twenty-four hours.



TEMPERATURE CHART VI, 5.

There was a remission on the forty-ninth, fiftieth and fifty-first days, a recrudescence on the fifty-second and fifty-third and fifty-fifth to fifty-eighth days, followed by convalescence. The temperature was practically normal after the sixtieth day.

Why is the Ability of Mothers to Nurse their Children Disappearing?—Among 1,629 cases, Prof. Bunge, of Basel (*Virchow's Archiv.*, 1904, p. 185), found 519 women "capable" of nursing their offspring for 9 months, the remainder, or 1,110, being "incapable." Among the 519 "capables," 423 could give information as to their own mother's nursing ability, and with one exception they had nursed their children. Of the mothers of the "incapables," 39.2 per cent. had nursed normally. Thus, almost without exception, the daughter of a mother who cannot nurse her children is likewise incapable: not only this, but the increase in incapables cannot be explained by heredity from the mother's side. Chronic alcoholism was present in the case of 78 per cent. of the fathers of those "incapables" whose mothers were "capables." On the other hand, only 2.6 per cent. of the "capable" daughters of "capable" mothers had had drunkards for fathers. Moreover, while only 1.6 per cent. of the "capables" were found to suffer from disorders of the nervous system, the enormous proportion of 25.9 per cent. was reached for the "incapable" daughters of "incapable" mothers. The nursing function, therefore, seems destined to disappear gradually, even without any increase of alcoholism among men. For, if it is true, as Bunge's statistics show, that this function once lost is almost never regained, then the number of "incapables" must be larger in each generation, for there will always be alcoholic fathers to beget "incapable" daughters from "capable" mothers.—*Editorial, Journal American Medical Association.*

AN EPIDEMIC OF VULVOVAGINITIS AMONG CHILDREN.*

BY A. C. COTTON, M.D.,

Chicago, Ill.

The specific character of the recent epidemic of vulvovaginitis among children in the hospital was satisfactorily demonstrated: First, clinically by a purulent, more or less copious, greenish or yellowish offensive discharge which was very intractable to treatment; second, by the undoubted infectiousness as seen in the rapid extension to other patients, in spite of ordinary means of prevention; third, by microscopic examinations and Gram's test of the discharges made by several members of the house staff in the early part of the epidemic. This was confirmed by reports from specimens submitted to Prof. Hektoen, and in the last 3 cases by the findings of Prof. LeCount, who succeeded in isolating in pure culture the gonococcus of Neisser. Mr. Baer, who did this work, gives the following summary:

"A diplococcus has been isolated in pure culture from 3 of your cases of vulvovaginitis. The diplococcus has been identified by its morphology, staining reactions and peculiar cultural reaction as the gonococcus. The medium best suited for its isolation and cultivation is a mixture of hydrocele serum, one part, and plain agar condensed to two-thirds its bulk, two parts; with an acidity to phenol phthalein of 1 per cent. With a medium containing ascitic fluid in place of hydrocele fluid, isolation was not accomplished, but cultivation of the organism was equally successful, growth being supported over periods of from four to seven days."

Number of Cases.—The epidemic extended from August, 1902, to September, 1903. During this period 319 children were admitted to the hospital, exclusive of the maternity and scarlet fever annexes, the average age being seven years and two months. There were 151 girls and 168 boys. The cases known to be infected numbered 19, only 1 of these being a male.

Age.—The extremes of ages were six months and thirteen years; between these there were one of eight months, two of two

*Read before the Sixteenth Annual Meeting of the American Pediatric Society, Detroit, Mich., May 31, 1904.

years, seven of three years, two of four years, three of six years, one of nine and one-half and one of ten years, respectively. Seven of these cases were three years old and but 3 of the 19 cases were over six years of age.

Chronology.—The first appearance of this infection in the children's ward was on August 8, 1902. No other child developed the disease until October 10th. After this 5 cases appeared on the 23d, 25th, 26th and the 31st. No more gonorrhea was reported for nearly two months, or until December 24th, another following quickly on the 26th, with two more on the 7th and 11th of January, 1903. After this no new cases appeared in the hospital till April, when three infected girls entered from the scarlet fever annex. The next vulvovaginal discharge was reported on June 3d, two on the 8th and one on the 12th, which completed the series.

Duration.—The record of the cured cases shows the average duration to have been 116 days; the shortest period of discharge was 40 days; the longest, including exacerbations and remissions, was 252 days.

Several of these patients showed apparent recoveries with negative smears, in whom the discharge appeared later.

Physical Condition of Patients.—Of interest for its possible influence on the duration of the infection, the average of which seems to be longer than is usually recorded, would be a consideration of the physical condition of the patients at the time of gonorrheal infection. Five of these patients were infected during the course of or while convalescent from typhoid fever and five were tuberculous; four had scarlet fever at some period of the disease; three had been operated on for cleft palate; two with congenital dislocation of hip had been treated by the Lorenz method; one was epileptic; one followed operation for genu valgum; one for anal fistula and one for venous angioma. The apparent lowered vital conditions in the majority of these cases cannot be overlooked in considering the persistence of the infection.

Complications.—Of these patients four received treatment for conjunctivitis, three of which were of very mild type. The fourth, the only one in which the discharge from the eye was examined, showed streptococci only. This case of ophthalmia was quite obstinate, receiving 10 per cent. protargol applications daily for a week. In this case the eye affection developed two days before the vaginitis.

One baby of six months developed a mild conjunctivitis probably four or five days after the vaginitis. A third ophthalmia of a mild type appeared in a six-year-old three days after a negative test of the vaginal secretions. The fourth, an eight-months' baby, had a slight eye discharge nine days prior to the vulvovaginitis.

Five cases were reported with suppurating ears. One, a six-year-old, had a double otitis following measles seventeen days prior to the vaginitis. One, three years old, had a right ear discharge following a pharyngitis, which occurred twenty-five days after the beginning of the vulvovaginitis. A three-year-old typhoid convalescent showed enlarged cervical glands, followed the next day by discharge from the left ear, on the thirty-third day of the infection. Number 4, another convalescent from typhoid, a child of four years, showed double otitis media a week following the vaginal infection. The 5th case developed ear trouble simultaneously with a scarlet fever eruption which preceded by nineteen days the vulvovaginitis. As no examination of the discharge from the ears was made and otitis media is known to be so prevalent among children, it would seem like straining a point to claim any etiologic responsibility to the gonococcus in these cases. These nineteen patients presented but one abscess, a suppurating axillary gland in a six-year-old typhoid convalescent, which was opened thirteen days before the vaginal discharge appeared.

None of these patients complained of articular pains, with the exception of a ten-year-old girl, who developed temperature and pains in both elbows and knees on the first day of a vaginal discharge, which occurred during convalescence from scarlet fever. This patient, also, furnished the only instance of peritonitis. Contrary to the observations of some, the vaginal discharge did not diminish with the appearance of peritoneal symptoms, nor was the onset severe. She made a good recovery from both vaginitis and peritonitis, and left the hospital a month after the development of the complication.

Intercurrent Infections.—Of intercurrent infections there were 4 of scarlet fever, 2 of measles and 1 each of pharyngitis, bronchitis and meningitis.

Sources of Infection.—The question of the sources of this infection requires a review of the chronology of its appearance and also the environment of the patients affected. The first discharge, observed August 8, 1902, was from the urethra of a two-year-old

boy under treatment for rectal fistula, seventeen days after his first operation, during which interim he had been taken daily to dressing room or clinic. The urethral secretion contained gonococci, but no microscopic examination of the discharge from the rectal fistula is reported.

Gonococci were next found in a vulvovaginal discharge in a typhoid fever patient two days after admission and five days after the reported cure of the first case. These two patients appear to have furnished the infection for this entire epidemic. Is it probable that this vulvovaginitis, which was noted forty-eight hours after admission, bears any relation to the gonorrhea of the boy, reported cured five days before? Both were diapered cases and it is barely within the possibilities that the little girl may have been exposed through an imperfectly disinfected napkin. Her sister, admitted the same day with typhoid, did not show a discharge until the eighteenth day of residence, 2 other cases having developed meanwhile. This long interval would appear to argue against the supposition that these sisters were infected at home. Six girls developed vulvovaginitis in the period of twenty-one days; 3 were typhoids and 3 were surgical cases; all were diapered and all had temperatures taken daily per rectum, with the ward thermometers. These six girls form a clinical group as no new cases appeared for *fifty-four days*. They were removed from the ward on the 4th of November, 1902, for the purpose of isolation, Room No. 301 being appropriated for their use. No infection occurred outside of this group until December 24th, when a vaginal discharge was observed in an eight-months-old surgical case. She had been operated for venous angioma of the face and was taken to clinic and dressing-room repeatedly. Search for the source of this infection brought to light the fact that her six-months-old cribmate, who showed a vaginal discharge two days later, had attracted attention by a suspicious odor for several days. A vaginal discharge from this baby may have been obscured by her profuse diarrhea. Further inquiry shows that this baby entered the ward December 12, 1902, from a room on the third floor adjoining that containing the six infected girls. She had been waiting there for an operation for cleft palate, which was performed December 13th, the day following her admission to ward. Is it possible that this baby was infected on the third floor while in proximity to the gonorrheal isolation ward? As the general children's ward was now quarantined for measles, these

two infected babies were retained, with the result that a vaginal discharge appeared in a four-year-old typhoid convalescent twelve days later, to be followed by another, January 11, 1903, after an interval of four days, *also* in a typhoid convalescent of six years. Both were diapered cases. No new patients being admitted, there remained in the ward four infected and two non-infected girls and five or six boys until February 14, 1903, when the quarantine for measles was raised and the ward was fumigated. The eight-months-old girl was taken home; the 3 remaining cases were sent to an isolation ward on the sixth floor, where they were soon joined by the four infected girls remaining from the first group, two having left the hospital. The six-months' baby died two days later, February 16th, of pneumonia, following the measles.

It is of interest to note here that a six-year-old girl, admitted to children's ward November 24, 1902, and operated on for cleft palate, is reported by the mother as showing a vaginal discharge the day after reaching home. She left the hospital December 12, 1902, no vaginal discharge having appeared at that time.

The next 3 cases form a group in which this infection was first observed at the scarlet fever annex, to which they had been removed from the children's ward. They were all surgical cases, who showed scarlet fever on the 28th of February, 2d and 6th of March, respectively. The discharge was first observed in the last patient to go, a two-year-old cleft palate case, who was reported with vaginitis the day she was transferred, although none had been discovered before leaving the children's ward. Four days later, March 10th, a four-year-old girl of the second gonorrheal group, isolated now on the sixth floor, developed scarlet fever and was transferred to the annex the same day, March 10, 1903. The annex records show that the discharge appeared in the other 2 cases on the 19th and 21st of the same month.

After the subsidence of the scarlet fever on the 6th of April, three of these patients were sent to the isolation ward on the sixth floor, the fourth having been taken home.

The last group comprises 4 surgical cases. The first, a three-year-old tubular spondilitic, admitted April 16th, showed vaginitis June 3d. The second, a thirteen-year-old, admitted April 22d, was operated May 25th for tubercular glands of the neck, and developed gonorrhea June 12th. The third, a three-year-old,

entered May 11th for correction of congenital dislocation of hip, and developed vulvovaginitis June 8th. The last, another three-year-old, admitted May 13th, with tubercular joint lesions, was operated May 19th, and developed gonorrhea June 8th.

Treatment.—It was found that the discharge yielded only to the more heroic forms of treatment. Most of the cured cases required 10 per cent. protargol douching every four to six hours, preceded by 1:2000 permanganate potassium solution, some obstinate cases requiring additional packing of the vagina with gauze saturated with 2 per cent. protargol.

Condition on Leaving the Hospital.—Of the 18 patients who showed the infection in the hospital, 10 were discharged cured, 2 died (intercurrent disorders) and 6 were removed by their friends while still under treatment. Those patients were pronounced cured from whom repeated smears were negative for nine days after cessation of treatment.

CONCLUSIONS.

Every hospital for children must be protected against infection from without by well arranged detention wards, in which the newly admitted patient may be submitted to the closest scrutiny for a period of at least fourteen days, to determine his freedom from acute infections before admission to the general ward.

A complete hospital should have ready for use, properly located isolation wards to which patients may be removed upon the first appearance of suspicious symptoms of an acute infection.

Gonorrhea is a most formidable disease in a children's hospital, and female infants are peculiarly susceptible to this disease.

A patient in a children's hospital showing gonorrhea should be promptly isolated and placed in charge of a special nurse. The interne or nurse while treating a gonorrheal patient should be relieved from other duties in the children's ward. The efficiency of any isolation may be questioned which does not individualize strictly not only in regard to the treatment, care and manipulation of the patient, but also as to the use of clothing, bed linen, feeding utensils, thermometers, douche pans, etc.

The same care by nurse and physician in sterilization is necessary as would be observed in going from a child with any acute infection to a non-infected child.

The question of exacerbation or reinfection as the cause of reappearance of the gonococci in the secretions after repeated

negative tests is an interesting one. This is especially true, where more than one infected child is isolated in the same room with the preponderance of probabilities in favor of the reinfection.

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DISCUSSION.

DR. NORTHRUP.—Every one of us has noted the wonderful susceptibility of the vagina and vulva to this infection. It is interesting that we seldom see the eyes affected when the vagina is so easily and persistently affected.

DR. KERLEY.—What has Dr. Cotton's experience been with gonorrheal arthritis?

DR. COTTON.—In the series of 19 cases reported there was but 1 case of joint involvement, and that followed a scarlet fever infection. I have had but a limited experience with gonorrheal arthritis in children. I recall but 1 case in which the arthritis was gonorrheal, and this occurred in a little girl, six years old, who contracted the gonorrhea from her father.

In the series there was but 1 severe case of conjunctivitis and 4 cases of slight conjunctival disturbances. The cultures did not show the organisms.

In regard to the greater susceptibility of the vagina and vulva over the conjunctiva in children, I believe this is due to the fact of greater exposure; children not diapered usually escape, while those diapered contract the disease more frequently. Again, the possibility of carrying infection by means of thermometers should not be forgotten. I believe this to be a fruitful source of the disease in very young children.

DR. JACOBI.—I have been struck with the fact that when the disease is located in the vagina it is rarely found in the conjunctiva, while, really, one would expect the reverse to take place. Children who are not diapered make their fingers go everywhere, and, by preference, about the abdomen; they must be expected to carry pus to the eyelids, and yet this rarely happens. But what does happen is a communication from one patient to another, until a whole ward becomes affected.

All have seen secondary infections from the cervix to the uterus and occasionally a nephritis and peritonitis; I believe all of us have had such cases—some very bad; such cases run a more favorable course than in adults. Dr. Huber drew attention to this in a paper some years ago. Cases of peritonitis secondary to gonorrhea are apt to get well. Dr. Northrup will well remember 2 cases occurring in the same family; in one a very severe arthritis developed, but the child finally got well.

I have seen 1 case lately which occurred in an unusual way. The baby was newly born. The mother died of puerperal sepsis on the fourth day after her confinement. On the eighth day the baby had a conjunctivitis and was brought into the ward. This was found to be a gonorrheal infection. The eye got better, the other eye was protected and did not become affected. About the fourth or fifth day (the child was eleven days old) the left side of the neck became tumefied, the glands became swollen, abscesses formed, were opened and found to contain gonococci. At the same time the left hand became swollen, abscesses formed, were opened and found to contain gonococci. The opening was made in the palm of the hand. The baby died on the sixteenth day. This child became infected in its passage through the vagina of the mother. The difficulty of curing these cases is great; there is an anatomical reason for this. There is a very narrow introitus. It has been recommended that the hymen should be removed, but this is a cruel procedure to which few will stoop. The difficulty of cleansing the parts is very great. Great difficulty is experienced in cleansing the cervix; the disease ascends to the uterus; between the third and fifth year the uterus grows only in its cervix. The inside of the organ soon becomes infected. The mucous membrane of the uterus is in folds and remains so until the ninth, tenth or eleventh year. It is between these folds that the gonococci find an abiding hiding-place, which resists treatment much more obstinately than even the posterior part of the male urethra. This is the reason for the difficulty encountered in reaching and attacking these organisms and explains, also, why the disease breaks out again when apparently cured. I have seen a number of cases during the past two years, in which the disease first appeared after the child had been in the hospital five, six, seven or eight weeks. I remember 1 case, which appeared when there was no other case in the ward; the child evidently came in with the disease and nobody noticed it. The disease may remain undiscovered for many weeks and months, just as in the male urethra. I know of nothing so difficult of removal as gonococci in the vagina and uterus.

DR. KERLEY.—I have an interesting observation to report, which was made at the Babies' Hospital during the service of Doctors Holt and Kimball. There have been as many as 18 to 20 cases of gonorrheal arthritis there during the past two years. It was peculiar in that, in the majority of the patients, who were boys, the infection took place without any external manifestation of the infection. Dr. Kimball has reported 8 cases, and of these, 7 took place in boy babies; the only possible source of infection was in the mouth through a stomatitis.

DR. LA FÉTRA.—I have seen several of the gonorrheal arthritis cases at the Babies' Hospital during the past year, and within the past three weeks I have had 2 additional cases of this disease at the Vanderbilt Clinic, one in a baby three weeks old, the other in a

child of eight months. The site of infection in the smaller baby was a circumcision wound, the history being given that the mother had had gonorrhea at the time the baby was born. There was no ophthalmia, but a balanitis. The ankles, wrists and interphalangeal joints were involved. The point of invasion could not be found in the larger baby.

These cases of gonorrheal arthritis are many of them really cases of peri-arthritis, the exudate being in the tissues outside the joint. The remarkable thing about this type of arthritis is that most of the cases do well with nonoperative treatment, such as wet dressings of alcohol, or of ichthyol, along with immobilization of the joints.

DR. ACKER.—I have seen but 2 cases that were complicated. One of these complications occurred in a girl, a cystitis; the other was an arthritis.

I find that, as a rule, the cases yield readily to treatment with 25 per cent. ichthyol and glycerine, packed in the vagina.

DR. COTTON.—The treatment I employed was copious douching with permanganate of potassium solution, 1-2000, followed by 10 per cent. protargol. In at least 6 of the cases the vaginas were packed with 2 per cent. protargol gauze, applied with dressing forceps. As I recall it, this was more efficient than anything else used. It has occurred to me that it would have been better to treat the cervical canal itself, because this canal is usually invaded by the organisms. If this were done it might be possible to get rid of the disease. How is it possible, otherwise, to get at the microorganisms after they have taken up their residence in the submucosa of the cervical canal?

DR. CAILLÉ.—Some years ago the attention of the Post Graduate Hospital was called to these cases because of a suit against the institution. A child was admitted apparently in good health and without noticeable vaginal discharge; within ten days she developed a severe specific vulvovaginal infection. Before admission this child had been examined most carefully, but nothing was found. Now, before admission, these children are most carefully examined and swab cultures made; if any specific condition is found they are rejected; if not found they are admitted. In this way we are able to keep out all cases of vulvovaginitis, although occasionally a case will develop in the hospital.

In the treatment of such cases the best results are obtained by swabbing the parts with a nitrate of silver solution, 5-10 per cent. protargol, and with permanganate of potassium. We never used the fountain syringe, as we have seen injury result from the use of the douche.

DR. ADAMS.—Usually these cases are admitted to the hospitals devoted to the care of children; if such cases are excluded because they possess some degree of contagion, what would become of these hospitals for children? In the Children's Hospitals in Washington, D. C., we admit these cases of vulvovaginitis

whether they are specific or not. So far we have not felt the necessity for excluding them.

Recently I have seen 7 cases of vulvovaginitis in the same family, undoubtedly specific. Direct infection was unquestionable, the question of the infection rested between the father and the mother; both undoubtedly had gonorrhea, and the mother claimed that she contracted the disease from the father. These children had slept alternately in the bed with their parents. All the children were within a short time admitted to the institution and treated successfully. So far as the babies' wards are concerned, we have a limited number of beds, only twelve, and the cases are not selected ones: occasionally we receive such an infectious case; when we do the doctors and nurses are impressed with the fact that the treatment of the case and its cure are not so important as the prevention of infection of other children in the wards. I do not know whether the experience in the Foundling Asylum agrees with my own or not. During six months there are usually entered about fifty babies, and they are brought from all the walks of life, the well-to-do and the vicious classes. In ten years I have yet to see a case of gonorrheal vulvovaginitis in that institution. We do have cases of conjunctivitis in the maternity service of hospitals sending babies to this institution; but investigation does not show always that they are of a specific nature. I believe that these cases, especially the girls, should be carefully examined before admission to the institution. Cases received in Washington conceal many pathological germs which later manifest themselves; they are latent and may become active later on. The nurses should be educated regarding the handling of these infectious cases and all precautions taken to prevent their spread; they should be taught the rules regarding cleanliness; if such education was enforced much of the difficulty would be overcome. I believe it is far better to admit these cases than to turn them away and let them depend upon the dispensary for their treatment. Judicious, systematic and symptomatic treatment should be employed.

Invagination in Children.—Kredel (*Mitteilungen a. d. Gengzgebieten*, Vol. XII., No. 5) operated on 8 out of 12 children with acute invagination of the intestines. Only one recovered spontaneously, and all the others died. All but 2 were less than one year old. He urges prompt intervention and special efforts to avoid shock. In severe cases he advises to ligate the mesentery and make an artificial anus, or possibly restrict the intervention to suturing to the incision of the first distended loop that comes to hand, opening it to allow evacuation of the contents. Rapid operating is the only hope; the second day is usually too late. The indications are as pressing as for incarcerated hernia. Enemata and insufflation of air are dangerous.—*Journal American Medical Association.*

A CONTRIBUTION TO DIPHTHERIA IN EARLY LIFE.*

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I.

HIDDEN NASAL DIPHTHERIA WITH SEVERE SYSTEMIC INFECTION.

During the past ten years the presence of diphtheria bacilli in the nasal secretions of young children suffering from "catarrhal rhinitis" has been reported repeatedly. Among seventy-five children with acute rhinitis, Stoos found the diphtheria (or the pseudodiphtheria) bacillus in 72 cases. As early as 1894 Heubner described cases of "larvirter" diphtheria. Others reported on their findings of this bacterial variety in the upper air passages of healthy children, especially in public institutions (Eric Müller, G. Raser, Chatin, Lessieur).

In the first case reported here, it will be shown that in hidden diphtheria only the positive finding of Löffler bacilli can be of diagnostic value.

J. C., female, aged twenty-three months, was attacked with acute rhinitis in February, 1902, which, excepting pallor and mouth-breathing, caused no annoyance to the strong child during the first four days, not even anorexia or unwillingness to play. Antiseptic spraying of the nares had been done very frequently. On the fifth day of illness (March 1) the child appeared cross and tired, and the father (a medical man) found a rectal temperature of 105° F. The family physician, who was then called in, found marked rhinitis, excoriations at the nasal entrances and a small amount of albumin in the urine. The secretion from the nose appeared clear and watery and contained no pus or blood.

Following the correct idea that, in spite of the absence of pseudomembranes on the visible nasal mucosa, true diphtheria might be present in this case, the family physician sent some of the secretion to the bacteriological laboratory of the Health Department. No Löffler bacilli were found.

* Read at the meeting of the German Medical Society, January 4, 1904.

As the temperature of the child remained high (between 103.5° and 105° F.) during the next few days, otitis media was thought of, although no complaints of pain had been made by the patient. An otologist found both drums somewhat bulging, and performed bilateral paracentesis, but very little serum escaped and the temperature remained the same.

When I met the three physicians at the bedside of this patient on the eighth day of illness, I found a strong, well nourished child, which showed no traces of severe illness during the examination, but, on the contrary, fought vigorously with hands and feet against every touch, and kept up a continuous loud screaming until we had left the room.

Puffiness of the face was absent. Mouth and throat appeared perfectly normal. The excoriations at the nasal entrances were very marked, and were covered in part by crusts. The entire lower nose appeared red and swollen. This condition could possibly have been caused by mechanical and chemical irritation during the frequent spraying of the nose.

Besides these excoriations, the rhinitis, the high temperature and the report of slight albuminuria, I found multiple, hard and very small swollen lymph nodes along the posterior half of the neck, especially between the deeper muscles. In size the nodes varied between those of a pin's head and those of a small pea. They were not visible and could not be felt by superficial touch, but only by thorough palpation. This finding, together with the other symptoms, compelled me (in the discussion of the case) to diagnose a primary nasal diphtheria followed by secondary nephritis and retro-cervical adenitis, in spite of the negative bacteriological report. Accordingly, I suggested immediate serum treatment, which, even in case of a negative result, would have a far greater diagnostic value than a single culture. As the local colonization of diphtheric bacilli in the upper nose and the nasopharynx could not be very extensive (because by this time pseudomembranes would have been visible in the pharynx), and as the high fever and the cervical lymph nodular infiltrations showed a marked systemic infection, I expected that Behring's serum brought into the blood of this child would develop a specially quick and energetic action in this case. All other local or systemic therapeutic measures were to be set aside.

Two thousand units of diphtheria antitoxin were injected the same evening, and on the following morning the father re-

ported by telephone that the temperature of the child had dropped nearly to 99° F.

Not until the fourth culture was examined, eight days after this consultation, were Löffler bacilli found in the nasal secretion. The discharge from the ears persisted for two weeks, causing occasional variations in temperature. No search for Löffler bacilli was made in this secretion. I had only seen the patient once. The history of this case proves

(1) That a negative report as to the presence of Löffler bacilli is of *no value* in a doubtful case of diphtheria; and

(2) That a serum test is indicated *wherever* diphtheria is suspected.

II.

DIPHTHERIA OF THE TONGUE, THE LIPS AND THE CONJUNCTIVAE WITH LITTLE SYSTEMIC INFECTION.

While in the previous case the local diphtheria was hidden and of small dimensions and the systemic symptoms were severe, quite the reverse presents itself in the following.

M. G., male, age seven weeks, was brought to my clinic on October 3, 1902. Emaciated by gastroenteritis since birth, although fed by good mother's milk, the child weighed but eight pounds. During the last week frequent and copious sour smelling stools. Extensive intertrigo with numerous excoriations covered with a grayish smear, involving the buttocks and the scrotum. Rectal temperature 99° F. Appetite fair. Acid eructations. Restless at night. Adipose tissue absent. Skin light gray, forming folds. Lung, heart, liver, spleen and urine normal.

The eyelids are puffy and closed. Scant watery nasal discharge. The mucosa of both lips are covered by a white-grayish thick continuous pseudomembrane, extending from one corner of the mouth to the other. No fetor ex ore. No lymph nodular swelling about the neck.

A diagnosis, comprising gastroenteritis, intertrigo and stomatitis so far appeared correct but for the unusual extent and the thickness of the exudate on the lips and the entire absence of odor, which in particular excluded mercurial stomatitis, although calomel had been used during the last few days. The low temperature also appeared suspicious.

On turning the puffy eyelids the same white, continuous mem-

brane presented itself on the upper and lower conjunctiva, which could easily be detached in toto. Pus was absent.

Inspection of the pharynx revealed pale and normal mucosa, but the entire anterior third of the tongue, above and below, was also covered with a continuous white pseudomembrane. The border of this exudate presented no infiltration and no edema.

The clinical diagnosis of diphtheria here had to rest on the conjunctival exudate and on the absence of odor from the mouth. As the pseudomembranes on the lips and on the tongue presented themselves before the eyelids were turned, it will appear but explicable that the absence of oral odor at first only seemed strange, for such an extensive diphtheria of both lips and the tongue (without throat involvement) so far I had not seen nor read of. The corresponding films upon the conjunctivæ naturally at once left no doubt as to the true nature of the case, for conjunctival diphtheria in infants is not infrequently met with. Diphtheria of the lips is rare, excepting where the whole oral cavity and the pharynx are involved. Diphtheria of the anterior third of the tongue without pharyngeal involvement and without severe systemic infection has not, to my knowledge, been described.

Two thousand units of diphtheria antitoxin were injected and, excepting the regulation of diet, rectal irrigations and frequent bathing of the parts covered by the intertrigo (then dried and dusted over by fullers' earth), no other therapeutic measures were used. After three days the pseudomembranes on the conjunctivæ and on the lips had disappeared entirely and those on the tongue to about one-third of their original size. This lingual exudate vanished after two more days. The excoriations on the buttocks and the scrotum also healed within a week. The general condition of the baby had been so improved within a few days, that the apparently contented child, looking up with clear eyes, could hardly be recognized.

Cultures taken from the surface of the pseudomembranes on the conjunctivæ, the lips, the tongue and the excoriations of the buttocks revealed but small numbers of Löffler bacilli (corresponding with the usual experience), while in the watery secretion of the nose (where no pseudomembranes were visible) diphtheria bacilli were found during the three following weeks. Cultures taken from the nipples of the maternal breast proved negative.

Astonishing in this case is the expansion of the local colonies

of diphtheric organisms with so little systemic poisoning. A doubt as to whether the organisms found were true or pseudo diphtheria bacilli cannot here be entertained, because Behring's serum proved effective. The question of virulence of the bacilli in this case can be left to a discussion among bacteriologists, for prior to the introduction of serumtherapy this patient would have beyond a doubt succumbed to this infection. That no postdiphtheric paralyses presented themselves after this manifold and extensive surface infection in so young a human organism, weakened by enteritis since birth, is another fact for speculation. This shows that not alone clinicians, but also bacteriologists, have as yet many unanswered questions to solve.

III.

PARALYSIS OF THE SOFT PALATE FROM HIDDEN DIPHTHERIA.

On April 8, 1903, I was requested to see the infant son of Mr. H. St. G., in Weehawken Heights, N. J., in consultation with his family physician.

The baby, eight weeks old, nursed by the mother, had appeared normal until six days ago, when fever up to 101.5° F. and apparent difficulty in deglutition had set in. Mild tonsilitis and pharyngitis were found by the family physician, without exudate, disappearing after three days, when the temperature returned to 97.5° F. But swallowing had become even more difficult, so that all efforts in that direction had ceased. Mother's milk poured into the mouth of the baby caused attacks of cough and of asphyxiation.

When seen by me on the evening of the seventh day of illness the child had not swallowed food for seventy-two hours. It was resting on its back, listless and languid. The pulse was weak and slow, the pupils dilated, the outer skin cool to the touch, the rectal temperature 96.5° F. The apathy of the child was striking.

No nasal discharge, the tongue was furred. The surface of the pharynx and of the tonsils appeared pale and normal. On palpation multiple hard infiltration of the posterior cervical lymph nodes was found between the deeper muscles of the neck.

On close inspection of the throat it now became apparent that although attempts at vomiting were caused by the introduction of the tongue depressor, the muscles of the velum palati and of

the uvula took no part in these contractions, and that instead these parts remained motionless even when touched by the spoon. This proved a paralysis of the soft palate, which fully explained the inability of the child to swallow.

The narrow space did not permit direct nasopharyngeal palpation.

In diagnosing this case the paralysis of the soft palate had to be primarily considered, because it presented the only definite symptom. The family physician, who did not notice the paralysis, had thought of a possible cerebral affection to which the marked apathy, the slow pulse and the dilated and slow-reacting pupils seemed to point.

In the discussion of this case I excluded a central cause for the pharyngeal paralysis for the following reasons:

(1) The paralysis appeared bilaterally well marked and equally divided on both sides. Tumor, cerebral abscess, hemorrhage and syphilitic endarteritis would each have caused unilateral symptoms.

(2) The regularity of the pulse and the absence of all convulsive symptoms excluded the possibility of meningitis.

(3) The apathy, the slow pulse, the cool skin, the flabbiness of the muscles and the subnormal temperature could all have been caused alone by starvation during the last three days, while again, these symptoms might be accepted as resulting in part at least from the general diphtheric infection accompanying the diphtheric pharyngeal paralysis.

Considered from the practical standpoint of the clinician, I was, in fact, forced to diagnosticate "early diphtheric pharyngeal paralysis" for the reason that in this manner alone the chances for a cure through Behring's serum were not diminished by delay. The multiple lymph nodular infiltration along the posterior neck presented plain evidence that absorption of infectious material from the nasopharynx was still continuing, and as the same infection had most likely caused the palatal paralysis, no other diagnosis than that of diphtheria could be made. The very early onset of the paralysis was unusual, but for all we knew the diphtheria might have been present for days before the family physician was called, and, besides, the extreme youth of the patient might have been in part to blame for this.

In accord with this diagnosis 2,000 units of diphtheria antitoxin were injected immediately (I always carry this with me),

the mother's breasts were pumped and the milk introduced into the stomach by means of a catheter and a funnel. No other therapy was resorted to.

Before departing, the fact was elicited from the family that an aunt of the baby (who had carried the child about more than the mother) had suffered from a sore throat during the previous week without medical attendance. An immediate inspection of this aunt's throat revealed the presence of a remaining strip of diphtheric pseudomembrane on the right tonsil.

Cultures taken the next day from the nose and the nasopharynx of the baby and examined in the bacteriological laboratory of the New York Health Department showed the presence of Löffler bacilli in large numbers and in almost pure culture.

The injection of the antitoxin and the regular feeding by catheter improved the child's general condition within twenty-four hours. The paralysis remained stationary for another seven days, then slowly improved and disappeared entirely after twelve days.

The chief points of interest in this case are:

- (1) The youth of the patient (eight weeks),
- (2) The early appearance of diphtheric paralysis,
- (3) The absence of visible diphtheria.

In conclusion, I would like to emphasize two points. The first is the diagnostic value of multiple retrocervical lymph nodular swelling in young children. If no outer source is visible, like eczema capillitii, this phenomenon usually points to nasopharyngeal infection. Acute catarrhal rhinitis is not associated with the symptom, but in chronic postnasal catarrh (so often met with even in very young children) it is always present, but here the infiltrated lymph nodes are usually larger and appear singly, scattered about the neck, probably because more infectious material could collect during the longer time and because very likely only certain portions of the mucosa are affected.

In early diphtheric invasion of the nasopharynx I have found different conditions. No doubt owing to the greater extension of diphtheria (in comparison to catarrh), we here usually find many small and hard lymph nodes, unevenly distributed, but in astonishing numbers. This multiple acute swelling of lymph nodes in this locality is usually due to extensive surface infection of the nasopharynx. The most important possibility is diphtheria. If this lymph nodular infection is found in acute rhinitis of children,

an injection of diphtheria antitoxin without delay is indicated, to my mind at least, and this even in cases where the temperature is normal or but slightly elevated.

The second point to be emphasized here is the doubtful value of an early bacteriological finding. Chance undoubtedly here usually decides the issue. To my mind the clinical diagnosis should guide our therapy in all acute infections. I need hardly refer to the tardy Widal test in typhoid. A negative bacteriological report in suspected diphtheria is absolutely worthless, while to wait for a positive report before injecting antitoxin may cause the period of ailment to pass in which this remedy could as yet have been curative. Exudate in a throat is highly suspicious of true diphtheria in every case, and here I rather prefer to rely on a serum test made in the body of the patient by an antitoxin injection than on a search for bacilli in a laboratory. The first means prompt action, effective treatment and safety to the patient; and if ineffective, at least the definite knowledge that diphtheria is absent. It has never occurred to me to treat the every-day cases of tonsilitis with antitoxin, but I do use it instantly where pseudo-membranes form.

The bacteriological report later on need not interfere with the diagnosis previously made by inspection and proved or disproved by the positive or negative action of the serum on the patient.

As the serum treatment of diphtheria has been tested now for fully ten years, the time ought to have arrived when it is not looked upon as a "last resort" and given after waiting for days, but as the *only correct treatment* and the *safest test* to firmly establish the diagnosis, and therefore should be given on the *first day* of medical attendance.

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HEAT VALUES AND FOOD VALUES.

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Perhaps the most characteristic feature of the more recent studies in nutrition is the extent to which its various problems have come to be regarded as problems in energetics. While it is no less true than of yore that the nutrients of the food serve to make good the losses of body substance consequent upon the vital activities and to build up new tissue, we have come to see that these are, after all, in a sense, subsidiary processes—that the animal body is essentially a transformer of energy and that the main function of food is to supply this energy.

This new point of view has been of immense advantage, particularly in introducing greater unity and simplicity into thought and discussion, but it has also given rise to some unfortunate misconceptions. The most convenient measure of the potential energy of the food is afforded by the amount of heat evolved when the food is completely oxidized; *i. e.*, by its heat of combustion. Moreover, the larger share of the energy liberated in the body leaves it in the form of heat, while the maintenance of an approximately constant body temperature is, in the higher animals, essential to the health and even the life of the organism. Very naturally, therefore, the quantities of energy involved in nutrition have been measured and expressed by means of some accepted heat unit; ordinarily the calorie. There is no objection to this, provided it is clearly understood that this unit is employed simply as a matter of practical convenience. Unfortunately, however, this has not always been the case, and the statement of food energy, body energy, etc., in terms of heat units has given rise to a tendency to identify heat and energy and to regard heat production as the principal function of the food. A more careful study of the subject, however, shows that, so far from this being the case, the heat production by the animal is, in an important sense, incidental, and the heat, to a considerable degree, an excrementum.

In considering the thermal relations between the animal and its environment, it conduces to simplicity to consider first the case of a fasting animal in a state of external rest. Numerous observations have shown that under these conditions the metabolic activ-

ities speedily tend to be reduced to the minimum required for the performance of the necessary bodily functions. Without attempting nice distinctions, we may say that such an animal expends energy for three general purposes. First, for the muscular work of the internal organs (especially of circulation and respiration), the maintenance of muscular tonus and such incidental muscular exertions as are made in what is commonly regarded as a state of rest; second, for the activities of the various secretory, absorptive and excretory organs, which we may roughly designate as glandular work; third, for such processes as imbibition, osmosis karyokinesis and the like, which we may call for convenience, cellular work. All these various forms of "internal work" are performed at the expense of the chemical energy stored up in the constituents of the tissues. This energy takes varied forms in different tissues and during different processes, but since the animal at rest does no mechanical work on its surroundings, it all ultimately appears as heat. It is important to note, however, that it is not until the original chemical energy has served its physiological purposes that it takes the form of heat. It is not first converted into heat which is then further converted into muscular or other work, but on the contrary it first gives rise to the muscular or other energy required, and the latter, in performing its functions, is degraded into heat. In other words, we have no evidence that the animal body is a form of heat engine. It is evident, then, that at least a part of the heat production of the animal is incidental to other purposes. At the same time, of course, the heat thus produced is available to maintain the body temperature, and the question at once arises whether the supply thus incidentally provided is sufficient, or whether additional body tissue must be metabolized simply for the sake of producing heat.

A satisfactory answer to this question requires a brief consideration of the manner in which heat escapes from the body.

Since the necessary metabolism of the living animal is a continual source of heat, it is obvious that in order to maintain the approximately constant body temperature of the warm-blooded animal the body must be able to give off this heat at the same average rate at which it is produced. Thus it has been computed that the heat produced in the human body in a single day, if all retained, would raise it to a pasteurizing temperature.

The body eliminates its heat in three principal ways, viz., by conduction, by radiation and by vaporization of water. At moder-

ate temperatures, the two processes first named are chiefly active. With a rise in the external temperature the tendency is, of course, to check the outflow of heat by these channels. This is counteracted, however, by a relaxation of the peripheral blood vessels, allowing a more rapid flow of blood through the capillaries and thus facilitating the elimination of heat. If the temperature continues to rise, this mechanism of regulation becomes inadequate, and the third process, the vaporization of water, comes into play in the familiar phenomenon of sweating, large amounts of heat being carried off as latent heat of vaporization. At high temperatures, this form of regulation is the prominent one, so that anything which, like a high relative humidity of the air, tends to check evaporation may cause great discomfort and even danger, while, on the other hand, even a slight breeze, tending to increase evaporation, may be a great relief.

These processes collectively constitute what has been called the "physical" regulation of the body temperature, and act through a considerable range of temperature. Necessarily, there is an upper limit beyond which these means of getting rid of heat become insufficient, and the fatal heat stagnation begins. As we go below this limit, the tendency of a falling temperature to withdraw heat from the body more rapidly is met by changes the reverse of those just described, and by their means the outflow of heat is kept practically constant and there is no increase in the amount of heat produced, but rather a slight decrease. As we follow this experimentally, however, we reach a point, known as the critical temperature, at which the possibilities of this physical regulation appear to reach their lower limit. The facility with which the surface of the body eliminates heat cannot be further reduced, and a continued reduction of the external temperature is met by a marked increase in the heat production—the so-called "chemical" regulation. The answer to our initial question, then, is that at or above the critical temperature, the incidental heat production due to the internal work of the body suffices, or more than suffices, to maintain its normal temperature, while below that point, additional body material must be oxidized for this special purpose.*

The critical temperature has been found to vary for different

*Of course, the relative humidity of the air and its rate of movement also affect the result; but since the temperature is the most important factor we may, for simplicity, deal chiefly with this.

animals. For naked man, according to Rubner, it is about 37° C.; for the dog, about 20° C.; for the guinea-pig, about 30° to 35° C. Civilized man, however, ordinarily keeps his immediate surroundings above his critical temperature, either by means of artificial heat or by clothing, or both, so that the regulation of his body temperature is chiefly or wholly by "physical" means. Indeed, there are not lacking indications that he has lost more or less the power of responding to cold by an increased heat production; *i. e.*, the power of "chemical" regulation.

Bearing these facts in mind, we are prepared to consider the relations between the food supply and the heat economy of the body.

It is an observation as old as the time of Lavoisier that the ingestion of food tends to cause an increased heat production, and this observation has been fully confirmed by more recent investigators, notably by Zuntz and his associates, and still more recently by Rubner. This augmented heat production arises in part from the muscular effort of prehension, mastication, deglutition, peristalsis, etc.; in part, doubtless, from the increased chemical activity of the glands of the digestive tract; and in part from the chemical changes involved in the conversion of the nutrients of the food into forms fitted to nourish the tissue. To the latter must be added, in herbivora, the extensive fermentations occurring in the digestive organs.

The quantity of heat thus generated is found to vary materially with the character of the food. Of the recognized classes of nutrients, the proteids cause the greatest relative heat production, amounting, according to Rubner's latest results, to about 31 per cent. of their total heat value; that is, out of 100 calories of energy supplied in the form of food proteids, 31 calories are liberated as heat in the process of digestion and assimilation. For fat he finds an increase of 12.7 per cent., and for sugar 5.8 per cent. The striking effect of proteid food upon the heat production is well established by other investigations, but Rubner's high figure for fat is considerably at variance with earlier results.

In addition to the proportion of the several nutrients, the physical condition of the food is of importance as affecting the mechanical labor of digestion and the nature of the processes going forward in the alimentary canal. Thus, to take an extreme case, the writer has recently shown that in the case of timothy hay, a material consisting largely of carbohydrates and related

bodies, fed to a steer, 37 per cent. of the energy of the digested matter was liberated as heat during digestion and assimilation, while similar (unpublished) experiments on corn-meal have given a percentage of about 20.

In the digestive and assimilative processes, then, we have an additional source of heat to the body. What relation, now, does this bear to the general heat economy of the body as already outlined? Briefly, we may answer, "substantially the same relation as heat from an external source." As already pointed out, the animal body appears incapable of utilizing energy in the form of heat. When it has once been degraded to this form it has escaped from the grasp of the organism. If, then, the body has already a sufficient supply of heat from other sources, that is, if its environment is above the critical temperature, that liberated during the digestion of the food will be of no advantage to it, but must be gotten rid of as an excretum, and at high temperatures may even become an additional burden. Below the critical temperature, on the other hand, the heat arising from the internal work of the fasting animal is insufficient to maintain the body temperature. Under these conditions, as Rubner has shown, the heat liberated in digestion and assimilation may make good the deficiency, thus preventing the oxidation of body tissue for this purpose and so being indirectly utilized. Below the critical temperature, then, the total heat value of the food may be utilized, in part directly as the chemical energy of the assimilated food, and in part indirectly by preventing the oxidation of tissue simply for the sake of heat production. This is, in fact, Rubner's law of "isodynamic replacement," which teaches that the nutrients of the food, aside from an indispensable minimum of proteids, are of value in proportion to the heat which they are capable of liberating in the body—the so-called "physiological heat values" or "fuel values."

It is the undue extension of this law of isodynamic replacement which is largely responsible for much of the current misconception concerning the relative energy values of foods and the relations of food to heat production. As announced by Rubner, it was limited to relatively small amounts of food, while his experiments were made at moderate or low temperatures. The seeming simplicity of the law, however, combined with the tendency already adverted to to identify heat and energy, have led many writers to assume that the "fuel value" of the food is a measure of its physiological value under all conditions.

As we have just seen, however, isodynamic replacement is the result of a sort of compensation, by which heat arising from digestive and other work is substituted for heat supplied by oxidation of tissue. Consequently, it obtains only within comparatively narrow limits, viz., under circumstances such that there would otherwise be a deficiency of heat. That is, it can occur only below the critical temperature and with amounts of food sufficiently small so that their digestion and assimilation will supply no more than the lacking amount of heat. Outside of these limits, the net physiological value of a food as a source of energy to the organism is measured, not by its "fuel value," but by the amount of chemical energy remaining after the expenditures necessary for its digestion and assimilation have been met. Logically, of course, this is equally true under all conditions, the effect being simply masked at low temperatures and with small amounts of food.

So far as the nutrition of man is concerned, then (and the same is probably true to a large degree of domestic animals), since his surroundings are ordinarily above the critical temperature, the "fuel value" of his food and its actual nutritive value, as measured in terms of energy, are not identical, the former being the greater. The well-fed individual is producing more heat than the actual needs of the organism require. He is engaged in getting rid of heat. His body may be compared to a house in which a fire is burning, the excess of heat being disposed of by opening the windows. Part of this heat arises from the necessary internal work of the organism and is fairly constant in amount (in a state of rest). The other and variable portion is due to the work of digestion, its amount depending on the quantity of food and on amount of energy which must be expended in its digestion and assimilation. The consumption of a small amount of easily digestible carbohydrates, for example, would result in a relatively small heat production, while a large quantity of proteids would greatly increase the loss of energy in this way.

At low temperatures, this additional heat production may be an advantage, enabling the well-fed organism to withstand cold better. The weather may become colder before the windows must be entirely closed and the consumption of fuel increased. The critical temperature of the well-fed animal is lower than that of the same animal when fasting. At high temperatures, on the other hand, this additional heat may become oppressive or even dangerous by adding to the amount which the organism must dispose of

through radiation, conduction and evaporation. A large consumption of difficultly digestible food renders the man or animal less able to endure hot weather, and presumably more liable to those disorders resulting from overheating. Instinct leads us to reduce the amount of food consumed in hot weather and, as Ranke has shown, in very hot weather the amount consumed may even be reduced below the actual demands of the body. Of the two evils, a loss of tissue is chosen in preference to an excessive heat production. Furthermore, proteid foods being those which cause the greatest production of heat, their amount in the dietary should be reduced to the minimum necessary for maintenance if it is desired to limit the heat production, their place as sources of energy being supplied by the carbohydrates and fats.

In brief, then, the food value of a nutrient as a source of energy to the organism is not measured by the total energy which it can liberate as heat in the body, but by the part of this energy which is available to the organism for physiological uses. The remainder of the "fuel value" simply serves to increase the generation of heat in the body, a result which may be advantageous or the reverse, according to the surrounding conditions.

Tuberculosis.—Saunders (*St. Louis Medical Review*, January 2, 1904), discusses the infection of tuberculosis, especially from cattle, admitting the possibility at least of skin infection, and rather favoring the opinion that alimentary infection is one of the most important methods of introduction of the germs in infancy. It seems, he says, that established facts as well as possibilities should compel admission that the bovine bacillus is virulent to man, and also a modified assent to Behring's statement. That alimentary infection in childhood is a prolific source of later manifestations of tuberculosis, especially in the bones, Saunders thoroughly believes. As regards the question whether bovine tuberculosis is less or more malignant in its course than infection from the human bacillus when introduced into the system, he thinks there is no evidence available to satisfactorily answer it. He has had one or two cases where he has suspected the communication of tuberculosis from one individual to another, but in these cases there was also the possibility of alimentary infection. He thinks the practical lessons are to pasteurize all the milk given in the first quarter of infant life, when the permeability of the mucous membrane is so great. After that we should use a mixed diet, but raw or underdone beef and, above all things, smoked sausages should be prohibited to children.—*Journal American Medical Association.*

SUGGESTIONS CONCERNING THE ACTIONS OF ALKALIES AND THEIR INDICATIONS IN INFANT FEEDING.

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Alkalies added to the diluents of cow's milk have long been employed in infant feeding under the impression that they acted as antacids neutralizing the acidity of cow's milk in order to make it conform to the supposed alkalinity of breast milk. Since breast milk has been proven to be actually faintly acid by the use of the delicate indicator phenolphthalein in the place of the misleading litmus test, this necessity has lost its force. But inasmuch as excellent practical results have been obtained clinically by the addition of such alkaline antacids as limewater and bicarbonate of soda, it is rational to endeavor to find the explanation of their successful use. In order to do this intelligently it is necessary that we should inquire carefully into the theory and practice of their use since the introduction of modern methods of modifying cow's milk. We find authorities stating that since breast milk is alkaline in reaction some alkali should be added to cow's milk to make its reaction correspond to breast milk, and it is taught that one part of lime-water to sixteen to twenty parts of cow's milk, either fresh from the cow or twenty-four hours old is sufficient for this purpose. Others state that 20 grains of bicarbonate of soda is the equivalent of 1 ounce of lime-water for such purpose. While this teaching is definite that 1 ounce of lime-water is sufficient to overcome the acidity and to produce an alkalinity corresponding to breast milk in 16 ounces of ordinary, whole, undiluted milk, the same authorities recommend the use of the same fixed quantity of 1 ounce of lime-water in every 20 ounces of the food mixture (milk and water) without any reference to the number of ounces of milk used in the mixture, so that the ounce of lime-water or 20 grains of bicarbonate of soda is used to neutralize the acidity in anywhere from 2 to 10, or even more, ounces of whole milk contained in the mixture. This divergence between theory and practice is best illustrated graphically by tables. Taking the 20-ounce mixture as an illustration; if in accordance with the theory, the milk which is to be used is first rendered alkaline by the addition of 5 per cent. of lime-water, or

1 grain of bicarbonate of soda to 1 ounce of whole milk, and this alkaline milk is then diluted to make the feeding mixture, the following table will show how much lime water or bicarbonate of soda each ounce of the food mixture would contain:—

TABLE I.—ALKALINITY REQUIRED BY THEORY.

Milk rendered Alkaline before Dilution.	Water.	Alkaline Food.	Lime Water to each oz. Food.	Grains Bicarb. Soda to each oz. Food.
1 oz.	+ 19 oz.	= 20 oz.	.25 per cent.	or 1-20 grain.
2 "	+ 18 "	= 20 "	.50 "	or 2-20 "
3 "	+ 17 "	= 20 "	.75 "	or 3-20 "
4 "	+ 16 "	= 20 "	1.00 "	or 4-20 "
5 "	+ 15 "	= 20 "	1.25 "	or 5-20 "
6 "	+ 14 "	= 20 "	1.50 "	or 6-20 "
7 "	+ 13 "	= 20 "	1.75 "	or 7-20 "
8 "	+ 12 "	= 20 "	2.00 "	or 8-20 "
9 "	+ 11 "	= 20 "	2.25 "	or 9-20 "
10 "	+ 10 "	= 20 "	2.50 "	or 10-20 "
20 "	+ —	20 "	5 00 "	or 1 "

The alkalinity of the *milk* is the same in each of the above mixtures, but the percentage of alkalinity in each ounce of the *food* varies with each mixture.

Again, taking the 20-ounce mixture as an illustration; if in accordance with practice 1 ounce of lime-water or 20 grains of bicarbonate of soda is added to each 20-ounce feeding mixture, the following table will show how much of each of these is added to each ounce of whole milk contained in the mixture:—

TABLE II.—ALKALINITY OBTAINED IN PRACTICE.

Water.	Milk.	Lime Water.	Bicarb. Soda.	Food.	Per cent. Lime Water to Milk.	Grs. Bicarb. Soda to each oz. Milk.
18 oz.	+ 1 oz.	+ 1 oz.	or 20 grs.	= 20 oz.	100 per cent.	20 grains.
17 "	+ 2 "	+ 1 "	or 20 "	= 20 "	50 "	10 "
16 "	+ 3 "	+ 1 "	or 20 "	= 20 "	33⅓ "	6½ "
15 "	+ 4 "	+ 1 "	or 20 "	= 20 "	25 "	5 "
14 "	+ 5 "	+ 1 "	or 20 "	= 20 "	20 "	4 "
13 "	+ 6 "	+ 1 "	or 20 "	= 20 "	16⅔ "	3½ "
12 "	+ 7 "	+ 1 "	or 20 "	= 20 "	14 "	3 "
11 "	+ 8 "	+ 1 "	or 20 "	= 20 "	12½ "	2½ "
10 "	+ 9 "	+ 1 "	or 20 "	= 20 "	11 "	2 "
—	19 "	+ 1 "	or 20 "	= 20 "	5 "	1 "

The alkalinity of the *food* is the same in each mixture, but the amount of alkali for each ounce of *milk* in the mixture varies with each mixture.

Even a cursory examination of these tables shows that in practice the theory of adding lime-water or bicarbonate of soda to the milk for the sole purpose of neutralizing its acidity is completely abandoned, for there is added to the milk anywhere from $2\frac{1}{2}$ to 20 times as much lime-water or bicarbonate of soda as it is stated is required to make it alkaline. This disproportion is greatest in the weaker mixtures containing but a few ounces of milk, such as are used for very young infants. Yet it is frequently recommended, or deemed advisable, to use double the usual quantity of lime-water or bicarbonate of soda for these same very young infants. This would be 2 ounces of lime-water or 40 grains of bicarbonate of soda to the 20-ounce mixture.

TABLE III.—DOUBLED ALKALINITY FOR VERY YOUNG INFANTS.

Water.	Milk.	Lime Water.	Bicarb. Soda.	Food.	Per cent. Lime Water to Milk.	Grs. Bicarb. Soda to each oz. Milk.
17 oz.	+ 1 oz.	+ 2 oz.	or 40 grs.	= 20 oz.	200 per cent.	40 grains.
16 "	+ 2 "	+ 2 "	or 40 "	= 20 "	100 "	20 "
15 "	+ 3 "	+ 2 "	or 40 "	= 20 "	66 $\frac{2}{3}$ "	13 "
14 "	+ 4 "	+ 2 "	or 40 "	= 20 "	50 "	10 "
13 "	+ 5 "	+ 2 "	or 40 "	= 20 "	40 "	8 "
12 "	+ 6 "	+ 2 "	or 40 "	= 20 "	33 $\frac{1}{3}$ "	7 "
11 "	+ 7 "	+ 2 "	or 40 "	= 20 "	28 "	6 "
10 "	+ 8 "	+ 2 "	or 40 "	= 20 "	25 "	5 "
—	18 "	+ 2 "	or 40 "	= 20 "	10 "	2 "

Not only, then, has practice been out of joint with the theory but, as was stated in the opening paragraph, the theory has vanished with the demonstration that breast milk is not alkaline, but faintly acid. However, as we have already stated, clinical results have been so satisfactory in the main, that instead of condemning the use of alkalies out of hand, because the original theory of their use has been disproved, we should rather see whether it is possible to find the scientific explanation of their successful employment.

In the first place, cow's milk, although only possessing a slight initial acidity when drawn from the udder, caused by the contained mucin and acid salts, develops later a secondary acidity due to lactic acid produced by the presence of certain bacteria.

This increasing acidity unless checked, may, under ordinary conditions, become a serious factor and may, when the milk is ingested, lead to the formation of more tough curds (lactates of paracasein) than can be digested by the pepsin secreted by the stomach, while these same curds are not in a form suited for intestinal digestion. The addition of an alkali may not only neutralize lactic acid as fast as it is produced, but will also cause the resolution of flocculi of the lactates of casein already formed. Were it possible to add the alkali in the exact amount necessary to neutralize the lactic acid and no more, the effect of the alkali would cease at this point. In practice, however, it either neutralizes but a part of the acid, if it has been added in smaller amount, or, if added in larger amount beyond that needed to combine with the acid, the excess renders the food alkaline when it enters the stomach. This alkalinity of the food must have a definite influence upon stomach digestion, for it is established that the rennet ferment will not act upon casein in the presence of alkali and the normal formation of paracasein clot is prevented until the alkali is neutralized or removed. Furthermore, an excess of alkali will neutralize the hydrochloric acid afterwards secreted by the stomach until the alkali is exhausted, and as pepsin cannot act except in an acid medium it is entirely conceivable that a sufficient excess of an alkali or antacid would entirely prevent stomach digestion and that the milk would be passed on unchanged into the intestine whose digestive secretions act readily upon it in an alkaline medium. In this manner the entire labor of digestion would be placed upon the intestine, and it is presumed that this is not infrequently the case where the alkaline addition is large.

When cow's milk with its peculiar casein is taken into the stomach undiluted or diluted with plain water, with no addition of alkali, the unrestrained action of the rennet ferment produces immediate clotting in large masses, and, if even a small amount of acid is present, these paracasein clots are more or less thoroughly transformed on their surface, at least, into firmer curds, which are not readily digested by the stomach, and being now in solid form are detained by the selective action of the pylorus and but slowly and reluctantly passed into the intestine. If stomachic digestion is overtaxed and fails to disintegrate them in whole or in part, they are finally passed into the intestine, where the portions suited for tryptic digestion are so incorporated with

those unsuited for this process that proper intestinal digestion is interfered with, and the intestine must work, or refuse to work, upon the botched material from an incompetent stomach.

On the other hand, a moderate amount of alkali which both neutralizes the hydrochloric and other acids already present in the stomach, and holds in check for a time the action of the rennet ferment, prevents the immediate clotting of all the milk by the rennet and allows time while enough acid is being secreted to overcome the alkali, for the escape of more or less unchanged alkaline milk into the intestine; so that, when an acid reaction is again finally established in the stomach, only a portion of the milk, depending on the length of time which has elapsed, remains in the stomach to form curds and to be digested by the gastric juice. This use of a more moderate amount of alkali has the definite advantage of dividing, to a varying extent, the digestion of the milk between the stomach and the intestine which reduces the amount of the milk clotted and subsequently curded in the stomach, to within the compass of the peptic digestion, while the intestine is allowed to initiate its own normal processes of digestion upon that portion of the alkaline milk which has escaped into its lumen.

There are, then, two possibilities. First, that a considerable amount of the alkali may prevent all stomach digestion, forcing the task of digestion upon the intestine, which, while often useful for limited periods, must necessarily interfere with the development of the gastric functions so necessary for the normal stomach if it is to become fitted to digest the solid diet of the adult. Second, that by adding a moderate amount of alkali, we may limit the task laid upon the stomach to one which it is able to perform. The choice between these two measures, or the possible rejection of both, will then depend entirely upon the type of case with which we have to deal.

The question has recently been raised whether we should add certain alkaline antacids to the food as a routine measure. Possibly not in those exceptional children who digest cow's milk easily in whatever form it is given, nor again, perhaps, when other measures are employed, which in some other way obviate the difficulties for which the alkalies are employed; but it must be remembered that we are often called upon to deal with disordered and overtaxed digestions, not forgetting that every infant who has to digest, instead of breast milk, the dissimilar

casein of cow's milk in sufficient quantities to attain a proper nutrition and growth is, to put it conservatively, at least subjected to the dangers of an overtaxed digestion.

Intestinal digestion is the only form of digestion of which the infant is capable at birth, hence the peculiar characteristics of colostrum; and if, as the gastric secretions of the infant appear, they form with the foreign casein of cow's milk, tough acid paracasein curds, compounds whose physical characteristics are so different from those which it would normally form with breast milk that the stomach may be unable to digest them, any previous treatment of, or addition to, the milk which will limit the degree to which this change takes place in the stomach, maintaining it in a softer form suited for the better developed intestinal digestion, may avert indigestion and consequent malnutrition and favor absorption, nutrition and growth at a critical period of the infant's existence.

Thus far it would seem a problem solely of the amount of the alkali to be added to the milk, but the kind of alkali employed is not without its own influence upon the results obtained. The alkalies most commonly chosen are lime-water and bicarbonate of soda, and of these lime-water is doubtless much more frequently employed. It is a common error to think of the two as interchangeable and as subserving exactly the same purposes. This is far from the case. They differ both in their properties as antacids and in the influence which they produce upon the milk and its curding.

Lime-water has the property which sodium bicarbonate does not possess, of swelling the mucoid proteid of milk, thickening the milk and making a visible change in its consistence. This very definite change in the milk cannot be without its effect upon the precipitation of the casein, favoring greater flocculence of the mass and consequently rendering it more readily attacked and penetrated by the digestive juices. Whether it forms any special compounds is yet to be determined. As an antacid lime-water is a very weak one, since 1 ounce, the quantity usually added to 20 ounces of an infant's food, neutralizes or is neutralized by only about $\frac{3}{4}$ grain of pure hydrochloric acid.

Sodium bicarbonate, as we have seen, does not swell the mucoid proteid of the milk, and therefore does not influence digestion in that way. But if a milk mixture, to which bicarbonate of soda has been added without subsequent heating, is in-

gested and there meets with acid, carbonic acid gas will be liberated during digestion, and if curds are formed they will be porous from the presence of minute bubbles of the gas. Such a porous curd should be more readily attacked during digestion than a dense one. However, when bicarbonate of soda is added to milk, it does not develop, nor show upon testing with litmus, all the alkalinity of which it is capable. If an infant's food, to which a sufficient amount of bicarbonate of soda has been added to render it but slightly alkaline to litmus, is then subjected to the action of heat by pasteurizing or sterilizing, carbonic acid gas will be liberated and carbonate of soda, washing soda, formed, which will give a more marked alkaline reaction to litmus and has a correspondingly greater effect in retarding the clotting action of the rennet ferment; while more or less of the carbonic acid gas having been driven off less porosity of the curd will be produced in the stomach if any curd is formed. Pasteurizing or sterilizing the food, therefore, subsequent to the addition of sodium bicarbonate, increases the degree of its active alkalinity and lessens the possibility of a more porous curd. If it is added to an infant's food according to the rules laid down in current text-books in the proportion of 1 to 2 grains to the ounce, 1 grain to each ounce would be 20 grains to 20 ounces, and this, as pointed out by Pisek, is relatively greatly in excess of the correspondingly prescribed amount of lime-water in neutralizing power upon acids, since 20 grains of sodium bicarbonate neutralize 9 grains of pure hydrochloric acid, or twelve times as much acid as 1 ounce of lime water would neutralize, although these quantities of the two alkalies are each apparently recommended to be added to 20 ounces of food as having the same effect.

On the face of this presentation of the matter, it would at first sight seem plain that the amount of bicarbonate of soda ordinarily used (20 grains to 20 ounces of food) was distinctly excessive; but this fails entirely to take into consideration another important factor, namely, the relative influence of lime-water and bicarbonate of soda in inhibiting the action of the rennet enzyme. The published experiments of Kerley, Gieschen and Myers show that the effect of 1 ounce of lime-water and 20 grains of bicarbonate of soda is about the same upon the clotting of the milk by rennet. Commercial bicarbonate of soda contains an alkali but is itself an antacid. The real alkalinity of bicarbonate of soda is produced by its impurities in the form of carbonate of soda which

is intensely alkaline. The U. S. Dispensatory formerly recognized this and allowed as high as 1 per cent. of this impurity in the "purified" and 5 per cent. in "commercial" sodium bicarbonate. The former, now alone officinal, must contain 98.6 per cent. of pure salt. It is soluble in 11.3 parts water at 59° F.; above that temperature the solution loses carbon dioxide, and at boiling heat the salt is converted into normal carbonate, losing 36.3 per cent. of its weight. The solution when freshly prepared with cold, distilled water, without shaking, gives a very faint alkaline reaction with litmus paper. The alkalinity increases by standing, agitation or increase of temperature. Actually, however, the alkalinity of bicarbonate of soda varies in different samples and, therefore, while its antacid value remains practically the same, its alkalinity, as shown in solution, may vary considerably and is markedly increased if the food has been pasteurized or sterilized. It is the alkali, not the antacid, which prevents the clotting by rennet.

The real differences, then, between lime-water and bicarbonate of soda when added to milk in the usual proportions, are, aside from their individual influences upon the subdivision and porosity of the curds, that while modifying or inhibiting the formation of the rennet clot (paracasein) to about the same extent, lime-water, being the weaker antacid, is quickly neutralized by the acid of the stomach, but sodium bicarbonate presents a decided antacid value which is overcome with much greater difficulty. The antacid effect of 1 ounce of lime-water is overcome by somewhat less than 1 ounce of gastric juice, based upon the acidity of the gastric juice of the adult which is 0.2 per cent., after which the usual stomach digestion can be resumed. But 20 grains of sodium bicarbonate require for their neutralization about 10 ounces of the same gastric juice and the resumption of stomach digestion is proportionately postponed. If this latter did not entirely prevent stomach digestion, 2 grains of bicarbonate of soda to the ounce, if employed, would probably do so effectually.

To sum up, therefore, milk diluted with plain water containing no alkali is promptly clotted in the stomach by the rennet ferment and the clot is transformed into tougher masses when acid is secreted.

Lime-water added to milk checks the immediate action of rennet upon the whole mass and makes the clotting more gradual, altering the form of the curd and allowing possibly of the pas-

sage of some unaltered milk into the intestine, but leaves no large amount of alkali behind to inhibit the stomach digestion.

With bicarbonate of soda added to milk, the action of rennet, hydrochloric acid and pepsin are all prevented by the greater amount of antacid present until this is finally neutralized. In the meantime, portions of the milk are not liable to get beyond the fluid state and continue to escape into the intestine. This reduces materially the burden of digestion laid upon the stomach or, if the alkalinity persists a sufficient time, relieves it entirely, the labor falling upon the intestine.

Milk is rendered alkaline to phenolphthalein, which should be used in all milk tests, by 60 to 100 per cent. of lime-water, and such milk is not curded by rennet. By glancing at tables No. 2 and No. 3, it will be seen that in practice from 60 to 200 per cent. of lime-water is added to the *milk* in mixtures ordinarily employed for young infants.

The effect of adding 5 or 10 per cent. of lime-water or its supposed equivalent, 1 to 2 grains of sodium bicarbonate to the ounce, to a mixture, depends entirely upon the amount of milk which the food contains. The usual practice of adding a fixed amount of lime-water or sodium bicarbonate to 20 ounces of food mixture, amounts, as we have shown in tables No. 2 and No. 3, to beginning the feeding of a young infant, whose food contains but a small amount of milk, with a milk which is highly alkalized. This high alkalization decreases as the child takes a stronger and stronger food containing more milk.

In the young infant the stomach is just beginning its functions and the earliest secretion which acts on the milk is rennet. In view of these facts, it is not difficult to understand the clinical effects of adding 10 per cent. lime-water, or 2 grains of bicarbonate of soda to the ounce, to the food of very young infants. The food is weak and the proportion of milk small. The 10 per cent. lime-water or 2 grains sodium bicarbonate to the ounce in the whole mixture makes this milk decidedly alkaline. The rennet ferment, therefore, will not act and the effect is to promote rapid emptying of the stomach for, whereas curded milk tends to be retained by the stomach, fluid milk tends to pass into the intestine. This assists in tiding the infant over a period of undeveloped and difficult gastric digestion, and as later the alkali is reduced directly from 10 per cent. to 5 per cent., or from 2 grains to 1 grain to the ounce, and also as the amount of alkali relative to the milk is

indirectly decreased by augmenting the amount of milk in the mixture, the effect of the alkali is gradually lessened.

The effect of adding alkalies to the food seems, then, to be that of influencing the place and type of the digestion of the food and the problems which must be worked out in the near future will be to determine the proper kinds of alkali and the quantity of such alkali to be added if we desire to produce certain specific results; and also to determine more accurately the indications for their use or non-use in different types of cases.

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To Promote Lactation.—Zlocisti (*Berlin. Klin. Woch.*, Vol. XLI., No. 5) argues that the infant after birth is as much dependent on the maternal organism for nutrition as during its fetal existence. It needs the milk as it needed the placental circulation before. He has applied to women the experience of stock raisers in regard to the value of cotton seed as a milk-producing substance for milch cows. The pulverized cotton seeds were given to nursing women when the milk seemed to be diminishing in quantity or quality, and the way the infants thrived on the milk produced in abundance afterward testified to the lactagogue efficacy of the "lactagol," as the powder is called. He urges the collection of statistics, showing the proportion of bottle-fed infants who have tuberculosis or cancer later, suggesting that the lack of breast nursing may prepare the soil for these diseases.—*Journal of the American Medical Association.*

Diphtheria Antitoxin Treatment by Various Routes.—Cruveilhier's experiments (*Annales de l'Institut Pasteur*, XVIII., No. 1) were all made on guinea-pigs under similar conditions. They demonstrated that in diphtheria, as in tetanus, after a certain period has elapsed, antitoxin is powerless, however introduced into the system. A single subcutaneous injection of .1 c.c ten hours after inoculation of the animal with the diphtheria culture saved its life. Injection of 1 c.c. lengthened the safe period by two hours, as also injection of the smaller amount directly into the brain. In a few instances the period of safety was prolonged to fourteen hours. Intravenous injection proved the most effectual of all. The period of safety was prolonged in every instance to sixteen hours. The intravenous route, therefore, is the best for diphtheria antitoxin. It proved effective in these tests six hours after a subcutaneous injection had lost all efficacy.—*Journal American Medical Association.*

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F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

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DILUENTS OF COW'S MILK.

When it was generally believed that the major differences between human milk and cow's milk lay in the relative quantities of fats, carbohydrates, proteids, mineral salts and water present, and in dissimilar reactions to litmus paper, it seemed rational to think that these differences could be readily overcome by dilution and readjustment of the composition of cow's milk, and an alteration of the reaction. It was vigorously taught that there was no advantage, but rather a disadvantage, in using cereal gruels as diluents, because the curds produced when water was used as a diluent were finer. Had the premises been correct it would

have been impossible to sustain any logical argument in favor of the addition of gruel diluents to cow's milk. But the premises were wrong. Any one familiar with the chemistry and physiology of milk, as now established beyond dispute, could not support the theory on which the teaching of the past few years has been based. To-day we have entirely new view-points. Some of the perplexing problems of the past have become simple in the light of our increased knowledge, and the teaching concerning the differences between human and cow's milk and the tests employed to demonstrate them can now be seen to have been plainly erroneous. Failures are oftentimes stepping stones to success, and in the pathway of infant feeding there have been many such stepping stones.

From the first division of the germinal cell to death, the body is nourished by fats, proteids, carbohydrates, mineral salts and water. These food elements are supplied from the mother's body; (1) from the yolk of the ovum; (2) from the fluids of the genital tract; (3) through the villi of the chorion; (4) through the placenta; and finally (5), through the mammary glands in the form of colostrum and milk. After weaning, they are derived principally from meat and cereals. From these facts it would seem that Nature changes the form in which the food is supplied as the infant develops, and this is the keynote to successful feeding.

Since the process of digestion of milk has become known—the first secretion of the stomach, the rennet ferment, changes it into a soft solid or curd; and then as pepsin and acid are secreted, how the acid combines with the curd to fit it for pepsin digestion and to make work for the stomach—it has become possible to understand the effect of many of the measures which have been successfully employed in artificial feeding.

It seems plain that the curds of milk are the prototypes of the solid food adapted to the stomach of the particular species. In the cow, digestion takes place to best advantage when the stomach is fully distended. Cow's milk forms a curd that is of the same bulk as the milk fully distending the calf's stomach. Hu-

man stomachs, on the contrary, are inconvenienced by large masses of food and human milk forms loose curds. The disturbances caused by the curds of cow's milk have been among the chief difficulties of feeding it to infants. As we know that curds will not be formed in the presence of alkalies, it is easy to see that the addition of alkalies to cow's milk would tend to keep the milk in a fluid state in the stomach and that the presence of a sufficient amount of alkali in the food would prevent any stomach digestion and the intestine would thus be forced to do all the work. The practice of adding alkalies to milk is ostensibly for the purpose of making the reaction the same as that of human milk, but in reality it has the effect of preventing or delaying the action of the stomach secretions on the milk. It has been demonstrated that both human and cow's milk are acid when properly tested, so really there is no indication for the addition of alkalies on the score of making the reactions conform. The premises of the older teaching have been shown beyond a doubt to be erroneous.

It has been clearly proven that cow's milk diluted with cereal diluents forms softer curds than when diluted with water. There are many careful observers who are convinced that they secure much better clinical results with gruel diluents than with plain water, or with water and alkalies. It has been theoretically objected that the infant cannot digest starch and that cereals are foreign bodies. Some infants can digest starch and others can appropriately digested gruels. Long before birth the products of starch digestion (glycogen derivatives) are found in the liver and cells of the fetus, so they cannot be looked upon as unnatural to the infant's system. Theoretically, the infant should take nothing into its digestive tract except what is secreted by the mother's breasts. Practically, it must often do so. Fresh cow's milk should be the basis of an infant's food, although a foreign substance, and almost the whole question of difference in the practice of pediatricians to-day is, shall alkalies be added to the milk to retard the action of the stomach secretions, or shall a gruel be used to soften the curds and allow full and free action by the stomach? Certainly, logic is on the side of the advocates of gruel

diluents, but rash conclusions should not be drawn and dogmatic teaching should be avoided. Human milk cannot be made from cow's milk, and there is no one method of feeding that succeeds in all cases. If a cereal diluent enables an infant to digest cow's milk and aids its nutrition its use is scientific. If the stomach secretions act on the milk too intensely, the retarding of their action by alkalies is scientific. The food must be adapted to the digestive tract, which should be encouraged to perform its function and not be persistently interfered with or perverted.

HENRY DWIGHT CHAPIN.

New Operation for the Cure of Congenital Displacement of the Testicle.—M. Katzenstein (*Deut. Med. Wochenschr.*, December 25, 1902) draws the testicle down into the scrotum after loosening its adhesions and constrictions. He draws it through an opening in the lower part of the scrotum, and fastens it to the adjacent skin of the thigh, a flap of which has been loosened and twisted on itself; in this manner he prevents the testicle from returning to the inguinal canal. The scrotum is then pulled over the testicle; the flap is very tense at first, but this tension disappears within from one to two weeks. After a week the scrotum is sewed to the skin flap, and as soon as the tension has entirely disappeared, the skin flap is severed from the thigh, and the two wounds are permitted to heal. He reports satisfactory results.—*American Medicine*.

Pyelitis in Infants.—Attention is called to the possibility of a primary pyelitis in infants which may be readily overlooked, as the urine of babies is rarely examined. M. Hartwig (*Berl. klin. Woch.*, November 30, 1903) reports 3 cases in which the clinical picture closely resembled typhoid. The symptoms consisted of a gradually increasing fever which continually returned even after the administration of antipyretics. This could not be accounted for by anything found on repeated physical examinations, until the urine was carefully examined. This was found cloudy and full of bacilli and pus corpuscles. The treatment consisted of various antipyretic measures, and bromid of sodium to guard against eclamptic seizures. Urinary antisepsis was secured by urotropin and turpentin. A cure resulted in from three to four weeks. The author advises that in every case of continued fever in a baby, where all other sources can be eliminated, including typhoid, the urine be carefully examined microscopically. Secondary pyelitis is common enough, but a primary form is rather rare, and should always be borne in mind in doubtful cases.—*Medical News*.

Bibliography.

Mental Defectives, Their History, Treatment and Training. By **Martin W. Barr, M.D.**, Chief Physician Pennsylvania Training School for Feeble-Minded Children, Elwyn, Pa. Illustrated. Pp. 368. Philadelphia: P. Blakiston's Son & Co., 1904. Price, \$4.00 net.

Probably there is no one in this country better fitted to write a work of this character and scope than Dr. Barr. The book embraces the accumulated knowledge and experience of twenty years' study of the subject. Its table of contents is a sufficient guarantee of its practical usefulness to the general practitioner.

Table of Contents.—I. Synonyms and Definitions. II. History. III. Classification. IV. Etiology. V. Diagnosis; Prognosis; Death Periods. VI. Training and Treatment. VII. Craniectomy; Asexualization. VIII. Cretinism and Myxedema. IX. Microcephalus and Hydrocephalus. X. Epilepsy. XI. Idiots Savants; Insanity. XII. Echolalia. XIII. Adenoma Sebaceum. XIV. Illustrative Cases. Profound Apathetic Unimprovable Idiots; Profound Excitable Unimprovable Idiots; Superficial Apathetic Improvable Idiots; Superficial Excitable Improvable Idiots; Idio-Imbeciles. XV. Illustrative Cases (continued) Imbeciles; Low Grade; Middle Grade; High Grade. XVI. Illustrative Cases (continued) Moral Imbeciles; Low Grade, Middle Grade; High Grade. XVII. Illustrative Cases (continued) Backward Children; Imbeciles by Deprivation; Negroid Type; American Indian Type; Mongolian Type. XVIII. Illustrative Cases (continued). Craniectomy; Cretinoids; Myxedema; Microcephalus; Hydrocephalus; Idiots Savants; Insanity. XIX. Illustrative Cases (concluded). Epilepsy; Grand Mal; Petit Mal; Jacksonian; Psychic. XX. The Case of Samuel Henderson, Murderer; Responsible or Irresponsible? XXI. Stories of the Children; Bibliography; Index.

While the data presented proves the utter hopelessness of cure in idiocy and the economic inutility of the attempt, it shows definitely the possibilities of training the imbecile, the urgent need of preventing the backward child from degenerating into imbecility,

and the means by which we may safeguard the absolutely irresponsible "amoral" imbecile from crime and its penalty.

There are places in the work where one regrets the looseness and inexactness of the text. This minor defect may perhaps be accounted for, as the book embraces studies intended for the comprehension of the lay as well as medical reader. The volume is excellently and profusely illustrated. The author's gentleness of dedication is an earnest of his sympathy with his work. "To those whom the French have so touchingly named *les enfants du bon dieu*, and to a mother deeply interested in them, this work is dedicated."

; **Progressive Medicine, Vol. IV., December, 1904.**—A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by **Hobart Amory Hare, M.D.**, assisted by **H. R. M. Landis, M.D.** Pp. 374. Illustrated. Philadelphia and New York: Lea Brothers' & Co. [Per annum, cloth, \$9.00; paper, \$6.00.

A quarterly volume giving a *résumé* of medical literature has many topics of interest, but the attention of pediatric specialists should be directed to Dr. Bloodgood's abstract of the literature of arthritis deformans in the young, and chronic arthritis in children. Dr. Bradford's study of functional albuminuria, chronic interstitial nephritis and congenital hydronephrosis should not be overlooked.

Paratyphoid in Children.—One of the two children reported by Allaria (*Riforma Medica*, XIX., No. 47) was two, the other seven, and both presented the typical symptoms of typhoid fever, including enlargement of the spleen. In one there was no hyperleucocytosis and the pulse was dicrotic. In the other there were roseola patches, and other members of the family were similarly affected. The fever persisted thirty-two and twelve days, terminating with a crisis in the first case. The agglutination test with typhoid bacilli was negative, but faintly positive with colon bacilli, but the cultures derived demonstrated that the infection was due to a paratyphoid bacillus. Allaria is convinced that the typhoid bacillus, the colon bacillus and the paratyphoid bacillus are each able to produce a specific disease, the symptom-complex of which may be identical for each, but which are in reality three different diseases, etiologically considered, and they can be absolutely differentiated by the agglutination test—*Journal American Medical Association*.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, December 8, 1904.

DAVID BOVAIRD, JR., M.D., CHAIRMAN.

RACHITIC FRACTURE OF FEMORA, WITH RADIOGRAPH.

DR. L. E. LA FÉTRA presented this patient, who had been of particular interest because of the difficulty in making a diagnosis. When first seen the child was twenty-one months old; it could not walk, stand nor sit up without support. Rachitic symptoms, such as sweating of the head, bowing of the humeri and radii, protrusion of the tongue, enlarged spleen and liver were present; there was also hyperplasia of inguinal and epitrochlear glands. There was an angular deformity of the femora with convexity outwards, with some swelling and tenderness at the middle of the shaft of the femora. Syphilis and scurvy were thought of, but excluded; the tenderness was at the middle of the femora and not at the epiphysis. No attempt was made to correct the deformity when first seen because of the bad condition of the child. The deformity was quite misleading in that it closely resembled the simple antero-external deformity of rickets without fracture. Had it not been for the discovery of the tenderness over the seat of fracture, in all probability the diagnosis would not have been made. The radiograph showed a green-stick fracture in each femur at about the middle of the shaft.

RESULT OF TREATMENT IN CASE OF ERYTHEMA INDURATUM (SCROFULODERMA).

DR. L. E. LA FÉTRA presented also a boy whom he first saw in June, 1903, when two years old. The child was presented to show the improvement that had taken place since that time. A brief history of the patient was given. There had never been any night sweats, fever nor exposure to tuberculosis. The spots of erythema induratum could be better felt in the skin than seen and

they appeared pretty well distributed over the body, on both sides of the face, the inner aspect of right forearm and left hand, near the patella, the right calf, the left leg, over front of thigh, sole of right foot, outer side of buttocks, etc. Guaiacol was given in 2 minim doses twice a day, and cod-liver oil. Before the appearance of the eruption the child had a dactylitis which opened spontaneously; the pus contained no tubercle bacilli. A nodule on the left hand was excised and examined by Dr. Lartigau; a few tubercle bacilli, along with tubercle tissue, were found as well as a mass of cheesy material in its centre. Last February the child had measles, which was followed by a lobar pneumonia. This was interesting, inasmuch as such a combination of diseases predisposes to tuberculosis of the lungs, and because this child had tuberculosis in the skin all over its body. The lungs have never shown any signs of tuberculosis and are apparently entirely healthy. There was an absence of general glandular involvement.

DR. JACOB SOBEL said that it was rather unusual to have the eruption appear upon face, trunk and upper extremities. Whenever this condition had been diagnosed early before ulcerations had occurred the chances for improvement were very much better than when the diagnosis was made late.

DR. DAVID BOVAIRD, JR., said that he left college with the impression that swellings of the phalanges were always syphilitic, while nearly all cases of dactylitis that he had since seen were found to be tuberculous.

A CASE OF CEPHALOCELE OCCIPITALIS INFERIOR.

DR. SARA WELT-KAKELS presented a patient nine months old, breast-fed, whom she had seen three weeks previously on account of a tumor on the occiput. The parents were healthy. There were five children, the last being the one presented. The patient was cyanosed at birth, breathing very feebly. The tumor was noticeable at birth and had not grown since. The baby had suffered from whooping-cough, and just previous to the time Dr. Welt-Kakels saw her she had diarrhea and vomiting. At present the child was poorly nourished, the organs of the chest and abdomen were normal; thymus dullness present, liver slightly enlarged, spleen easily palpable, urine free from albumin and sugar; a tumor in the occipital region, soft, compressible, translucent, was covered by normal skin. The tumor increased when the child

cried and could be reduced by pressure. After reduction an opening in the skull could be made out, which seemed to communicate with the foramen magnum. Examination with the x-ray revealed a slight shadow which might be caused by cerebral substance. After referring to the old division of these tumors into meningocele, encephalocele and hydroencephalocele she said that the origin of these malformations was dependent upon a faulty closure of the cerebrospinal tube, which occurred about the second week of fetal life. In some cases amniotic adhesions might be responsible for this condition. The prognosis was bad. The results of surgery offered much encouragement.

DEMONSTRATION OF METHOD OF OBTAINING URINE FROM A FEMALE INFANT.

DR. SARA WELT-KAKELS gave this demonstration, using for the purpose a small bottle and a strip of adhesive plaster, split to make a 4-tailed bandage.

REMARKABLE MENTAL IMPROVEMENT FOLLOWING OPERATION FOR DEPRESSED FRACTURE OF THE SKULL.

DR. B. V. D. HEDGES, of Plainfield, N. J., presented a boy who was hit on the head with a brick and sustained a depressed fracture six years ago. Until then he had been a perfectly normal child, but during the next four years a great change had been noted in his mental and moral character. He was a vicious and bad boy, he stole, and the neighbors would not allow their children to play with him. He had sudden outbreaks of temper, was very indecent, lied, and was devoid of any love for family. The mother brought the boy to the hospital to see if something could be done. The entire area of depressed bone was removed and with the happiest of results. One year later it was learned that his character had changed entirely, both morally and mentally, and that he had developed a proper love for family, was intelligent, and the improvement of his condition was most satisfactory. The chief interest in the case centred upon the functions of the pre-frontal lobe and whether this had to do with the change in his mental and moral obliquity.

HYPERTROPHY AND STENOSIS OF THE PYLORUS IN INFANTS.

DR. F. L. WACHENHEIM, reading the paper of the evening, said that thus far only about 60 cases of this affection has been

reported and he wished to add the case of an infant, aged five weeks. The child was breast-fed, had had uncontrollable vomiting after the second week, the condition of the bowels varying from constipation to moderate diarrhea with green stools. There was extreme loss of flesh and strength. Only very dilute water and limewater were retained and these not invariably. After five days' observation he was led to suspect a hypertrophic stenosis of the pylorus, though the stools might suggest a catarrhal condition of the stomach. The child died at the age of seven weeks and the autopsy confirmed the diagnosis. There was enlargement and moderate congestion of the liver and spleen. The liver overlapped the pyloric region and under it the almost cartilaginous mass of the pylorus could be palpated. The pyloric end of the stomach was 3 cm. in length, and so thick and firm as to appear like a new growth. Its diameter was 14 mm., while that of the duodenum was only 8 mm. The walls of the pylorus consisted chiefly of muscle, together with a thickening of the submucous tissue. The mucous membrane appeared perfectly normal but was thrown into longitudinal folds. He considered chiefly the aggravated form of this affection which was either relieved by surgical means or else resulted in death within a few weeks. He deduced the following clinical picture from the relatively small number of cases that had come to autopsy. The average age at onset was two weeks, and the average age at death nine and one-half weeks. He considered that cases surviving beyond four months did not belong to this class, for while presenting mild symptoms of obstruction they often attained an age beyond infancy and sometimes adult life, always showing slight obstructive symptoms unless relief was sought through operation. Males were affected oftener than females in the proportion of $2\frac{1}{2}$ to 1. Almost all the infants in the cases reported were breast-fed, so that improper food could not be considered as a causative factor. In a number of cases pure water and thin barley water were retained, while food forming more or less solid masses in the stomach were rejected. The vomiting was forcible. The acidity of the vomited matter was not always due to free HCl. Biliary vomiting sometimes occurred. This symptom and diarrhea with green stools often gave rise to grave diagnostic doubts. It sometimes took as long as a week of close observation before a diagnosis could be made, and in these cases such delay was very prejudicial to the patient. Most cases remained unrecognized and unreported, being usually passed by

as gastrointestinal catarrh. On account of the constant crying, which caused rigidity of the abdominal muscles, it was very difficult, if not impossible, to detect the hypertrophied pylorus by palpation. As a rule visible peristalsis and dilatation of the stomach could only be noted when that organ was well filled; sometimes only in the terminal stages of the disease and at other times not at all.

Clinicians held very different positions in regard to the pathogenesis of this condition. Some were of the opinion that the chief element in this disease was spasm, that hypertrophy was secondary and not of high degree, that the short duration of the disease would permit of only moderate muscular growth, that serious and permanent changes were inconsistent with the reported cures, and that the narrowing of the pyloric lumen was often very slight as shown by autopsies. Another class were of the opinion that the lesion was wholly anatomical. Still others among which the author of the paper classed himself were prepared to accept both propositions. There might be one condition that consisted in the overgrowth of the muscular tissue, aggravated by tonic contraction. They could also admit a spasm pure and simple which might possibly be accompanied by some slight muscular hypertrophy. The prognosis in the first condition was evidently bad, while that in the second was fairly good. There might also exist a combination of the two conditions. According to our most reliable authorities a pyloric lumen of 5 mm., at two or three months, could hardly amount to a serious obstruction, but when the lumen measured less than 3 mm. the attendant spasm of the hypertrophied muscle would be sufficient to cause almost complete obstruction. No case of absolute obstruction has been reported. The histological findings in this case showed that the submucosa was about twice the normal thickness, and the overgrowth of the longitudinal muscles was proportionately nearly as great. There was moderate amount of inflammatory reaction in the muscular coats, but no change in the blood vessels out of proportion to the excessive development of other tissues. Dr. Wachenheim was of the opinion that the disease was not so rare as had been supposed. It was especially difficult to diagnose in the summer when there might be a combination of pyloric stricture with digestive disturbance. The point to be noted in the diagnosis of this affection was the combination of obstinate vomiting with equally obstinate constipation and gradual loss of weight.

The violence of the vomiting and its close relation with the ingestion of food was another important point. An appetite above normal in such a condition was a combination that one would hardly find in any other disease.

In the treatment of these cases it was well to assume at first that we had the milder condition and to treat accordingly. Freund recommended Carlsbad water together with the usual diet, breast-milk and later whole milk. Lavage seemed to give some relief. Small and frequent meals of highly diluted albumin and barley water were also recommended. Unless the infant increased in strength and weight in two weeks it was useless to continue this treatment, as surgical intervention offered the only hope of relief. Operative intervention was attended by high mortality. In a summary showing the surgical procedures that had been employed, together with the results, he stated that of 15 cases in which gastroenterostomy (suture) was performed 6 recovered and 9 died; 1 case of gastroenterostomy (Murphy) was fatal; 4 cases of pyloroplasty resulted in 2 cured and 2 deaths; 3 cases in which divulsion was performed gave 2 cures and 1 death. This showed the total mortality to be 57 per cent., and it was probably much higher than this. There seemed to be but little choice of operations, the results being about the same in all, but it was too soon to form an opinion on this matter.

DR. BOVAIRD said that it was noteworthy that Americans had contributed a very small number of cases to literature and he believed that these cases were much more common than generally supposed. To define a normal pylorus and give measurements was very difficult unless many comparisons were made.

DR. JOHN DORNING said there was no question regarding the difficulty encountered in making a diagnosis of pyloric obstruction in infants. Although these symptoms appeared to be classical there was the danger of confounding them with a simple gastritis, or vomiting of infancy. With regard to palpating the abdominal contents much difficulty was experienced, unless the infants were very markedly emaciated and apathetic and abdominal walls relaxed. In cases where there was much resistance he found it expedient to give a few whiffs of chloroform and then palpation could be readily done. He had done this in hundreds of cases and without a single untoward result. Many of these cases of pyloric obstruction in infancy he believed were overlooked and many cases

had been reported by men who had seen probably one case clinically, or who had been present at some meeting when such cases or specimens were presented; in this way their attention had been called to it and they then had been on the lookout for such cases. The case that Dr. Dorning succeeded in getting an autopsy on might have been overlooked had not consent for an autopsy been given. Regarding gastroenterostomy in infants and their results he said that comparatively little was known, and nothing could be known unless these cases were followed for months and perhaps years. Neither do we know whether an opening made into the stomach of an infant would contract and become obliterated; such contractions might result fatally. They did not occur in the intestinal mucous membrane, but only in that of the stomach, and no adequate reason had been given for it.

DR. ROWLAND G. FREEMAN emphasized the statement that many of these cases were undoubtedly overlooked, and also that many cases reported were not really cases of stenosis at all; this simple thickening of the gut was often very deceptive and he had seen at last 1 case in which there was no thickening to be seen in the specimen at all.

DR. WACHENHEIM said that in all the autopsy cases pains had been taken to exclude all doubtful cases. There were as many as 30 or 40 cases in which the children recovered, or else died and no autopsies were made, and these were excluded. Cases were not accepted without the report of findings at autopsy. It was extremely difficult to fix the border line between a pathological thickening of the pylorus and a normal pylorus.

ELECTION OF OFFICERS FOR 1905.

The following was the result: chairman, Dr. L. E. La Fétra; secretary, Dr. John Howland.

Current Literature.

PATHOLOGY.

Marfan, A. B. : Cardiac Thrombosis and Embolus of the Abdominal Aorta after a Malignant Diphtheritic Angina. (*Annales de Méd. et Chir. Infant.*, July 1, 1904, p. 450.)

The case refers to a boy of six years, with no antecedent history of importance. The child presented all the symptoms of a malignant diphtheritic angina, without involvement of the larynx, and was treated actively with antidiphtheritic serum, with the result that the local and general condition rapidly improved. On the tenth day there were signs of palatal paralysis; on the eleventh, cardiac irregularly with fetal rhythm; on the thirteenth day the child was suddenly seized with terrific pain in the centre of the abdomen, accompanied by marked prostration. The diagnosis of perforating appendicitis, or diphtheritic-paralyses, were rejected and a tentative diagnosis was made of cardiac thrombosis followed by embolus. The boy died the following day. At autopsy both auricles were found to contain freshly formed fibrinated clots: the apex of the left ventricle was filled with a dark granular clot slightly adherent to the endocardium. There was an interstitial and parenchymatous myocarditis with some endocarditis. Below the cardiac trunk the aorta was filled with a clot which descended into the iliac arteries, on the right stopping at the iliac bifurcation, on the left going as far as the external iliac and hypogastric arteries, and filling both mesenteric arteries. The embolus was soft, non-adherent and in no place was there any endocardial lesion.

Durante, Durando : Bacteriology of Bronchitis and Bronchopneumonia in Children. (*La Pediatria*, September, 1904, p. 633.)

Of 10 cases of bronchitis, 5 showed a negative result, and 5 a positive. In the latter group 4 showed the presence of the staphylococcus alone, and 1 the presence of micrococci. Of 10 cases of bronchopneumonia, 1 only gave a negative result, while the rest showed the presence of germs. Of these, 7 showed sta-

phylcocci, and of the latter, 3 were due to these germs alone, as they were obtained in pure culture, while the remaining 4 cases proved to be due to mixed infection of the staphylococcus with the pneumococcus (1 case); with the streptococcus (1 case) and with micrococci (in 2 cases). In 1 case the cultures showed only micrococci.

The question of the etiology of bronchitis and of bronchopneumonia in children does not appear to be solved by these researches, and further experiments are necessary before definite conclusions can be drawn. On the other hand, the work of Durante shows that bronchitis and bronchopneumonia in children are infectious diseases, and that they are due to germs which reside in the respiratory passages, in other words, that they are descending bronchogenic infections. In the negative cases the absence of germs was probably due to difficulties in technic. The most frequent germ was the staphylococcus.

MEDICINE.

Matzenauer, R. : The Hereditary Transmission of Syphilis.
(*La Pediatria*, January, 1904, p. 2.)

The author concludes from a detailed study of this question that Profeta's law does not hold; for there is no such thing as hereditary transmission of permanent immunity. On the other hand, all mothers, including those who are apparently perfectly healthy, who have given birth to a syphilitic child, are immune throughout life. This means that all mothers who have given birth to syphilitic children must be syphilitic. There cannot be hereditary syphilis without syphilis of the mother. The practical conclusions from this are that the mother of a syphilitic child should be treated with mercury, even if she does not present any symptoms. Such a mother can nurse her own child without danger to herself, according to the law of Colles.

In order to avoid infecting his wife, a man with syphilis should not marry for several years after he has become infected, and after he has passed through a number of mercurial cures. The entire doctrine as regards the hereditary transmission of syphilis is now very much simplified and we find that in syphilis the same laws obtain as in other infectious diseases.

McKee, James H.: **The Importance of Epistaxis in the Diagnosis of Diphtheria.** (*Therapeutic Gazette*, March 15, 1904, p. 157.)

McKee's views as to the importance of epistaxis are summarized as follows:

(1) Staining of the nasal discharge with blood is quite commonly seen in nasal diphtheria, and epistaxis of moderate severity is not infrequently observed.

(2) Nosebleed is a symptom of much diagnostic value, for it may suggest the possibility of nasal diphtheria in any case, but particularly in the mild case. Among the causes of epistaxis, diphtheria of the nose should be accorded a separate and prominent place.

(3) In malignant mixed, or streptodiphtheria of the nose, epistaxis may be most alarming and may even be the immediate cause of the fatal termination.

Ito, Sukehiko: **Clinical Observations upon "Ekiri"; a Peculiar, Very Acute Epidemic Disease of Childhood in Japan, Resembling Dysentery.** (*Archiv f. Kinder.*, Vol. xxxiv., p. 98.)

Japanese writers differ as to the origin of ekiri, which is a peculiar, very acute, epidemic disease, resembling dysentery, and occurring in children.

This disease has been recognized for the past hundred years.

Some regard it as a kind of acute meningitis (epidemic) because grave cerebral symptoms almost always accompany the disease, especially when it occurs in children. Others believe that ekiri is not a special disease, but an intestinal catarrh of acute epidemic type. Others, again, claim that ekiri, in a clinical sense, is but a severe form of the dysentery of childhood, and regard Shiga's dysentery bacillus as the cause. HIROTA, SEGAWA and others class ekiri as an acute follicular enteritis from a clinical as well as from a pathological standpoint.

Of these four views, the first two are entertained by but few. The last two have an equal number of supporters, who all concede that ekiri is an infectious disease.

The writer studied the bacteriology of the stools from cases of ekiri, and isolated a peculiar pathogenic organism which he calls the ekiribacillus.

OTSUKI, assistant in the Children's Clinic of the University

at Tokyo, investigated the same subject after the publication of the writer's work in 1898, and verified his results.

The ekiribacillus is morphologically like the colon bacillus; it is decolorized by Gram, is actively motile, does not liquefy gelatin, produces gas in glucose agar and is characterized by a retarded production of the indol reaction. It does not coagulate milk. It is pathogenic for mice, guinea-pigs and rabbits, and for hens and pigeons.

Agglutination occurs, with blood serum, from patients who have recovered from ekiri, or with the sera of animals immured to ekiri. The ekiri bacillus has never been found in healthy individuals, or in those suffering from any disease other than ekiri.

The sera of persons suffering from dysentery, which readily cause agglutination of Shiga's bacillus, do not agglutinate the ekiribacillus, and *vice versa*.

Judging from careful observation of 21 cases, the writer finds the incubation period of ekiri to be from twelve to twenty-four hours, sometimes as long as forty-eight hours, and in rare cases less than twelve hours.

A description of the symptoms is given, absence of tenesmus being emphasized. The stools which usually number 1 to 5 or ten in twenty-four hours contain mucus, with or without an admixture of blood; they rarely contain serous fluid and pus is found in small amount. The histories of 9 cases are given.

The prognosis is chiefly dependent upon age, death occurring most frequently in cases of from two to six years. Cases under two years of age are rare.

Zanetti, Leon : Pain in the Bones and its Rachitic Origin.
(*La Pediatria*, September, 1904, p. 644.)

This research, conducted in the Pediatric Clinic at Padua, concerns itself with the rachitic origin of osseous pain in children. Czerny has recently denied the occurrence of osseous pain in rickets—a clinical concept which has been generally recognized by the authorities. The present investigation convinced the author that Czerny was wrong in his assertion, and that all rachitic children suffer pain, which at times is severe. The pains in the bones of rachitic children come on in attacks and are much more marked at some periods of the disease than at others. The children will be found lying apathetically with relaxed limbs, and the slightest touch will cause pain. A few days later the pain

will so diminish that the same limbs may be handled without producing pain, and even very young children have been surprised at the painlessness of the manipulations, remembering their former experiences. The pain is not a spontaneous one. It exists with equal intensity both in the epiphyses and in the diaphyses. It is purely bony in character, and does not involve any other tissues. It lasts only during the time when pressure is made on the bones involved. The osseous pain of rickets is quite distinct from the irritability of the psychoneurotic sphere of the child. The intensity of the pain is not at all in proportion to the severity of the rachitic lesions.

[In the United States and in Great Britain such tenderness even in rachitic children is generally found to be due to associated infantile scurvy. Scurvy should always be excluded when there is tenderness of the limbs, particularly the lower extremities.—*Ed.*]

Beccherle, Guido: Studies on the Outlines of the Heart Area of the Child. (*La Pediatria*, September, 1904, p. 656.)

Tedeschi has remarked jocularly that the matter of percussing the heart area of a child must remain a secret between the examiner and the little patient. Following the advice implied in this aphorism, the author studied the limits of the cardiac areas of a series of children, employing the greatest possible delicacy in percussing. In his conclusions he emphasizes the great necessity of gentleness in percussing over the hearts of children, as the slightest excess of force leads the examiner away from the correct lines limiting the cardiac area of dulness. Both the ear and the resistance offered to tactile perception must be employed, in order to get the best results. He found that the heart in very young children is placed higher than in later life, and is almost horizontal in position. As the child grows, the heart sinks lower, grows larger, and becomes more vertical, until, at the seventh year, it coincides with the nipple at its apex. Still later the apex is found lower and internal to the nipple. During childhood the heart grows steadily until the ninth year, when it begins to grow more rapidly in order to fulfil the increased demands on it. The absolute area of dulness is always relatively larger in childhood than in adult life. The relative area should be determined together with the absolute in all cases.

The method of percussion preferred as being both simple and

accurate, is as follows:—The fixed point from which he starts is a point which is always within the area of dulness and is located in the third space, 1 cm., outside of the left sternal margin. From this point he percusses at first upward and then downward, parallel to the sternum. Then, starting from the same point, he percusses transversely, marking the limits of dulness as he goes along, and, finally, obliquely, repeating the process. A line is then drawn uniting these joints, and a quadrangular figure is obtained, indicating the relative dulness of the heart of the child. The same procedure is used to show the absolute dulness.

HYGIENE AND THERAPEUTICS.

Variot: Purpura and Miliary Tuberculosis. (*Jour. de Méd. Int.*, August 1, 1904, p. 226.)

A child presented the signs of purpura—ecchymotic spots on the face and hands—epistaxis and intestinal hemorrhages. Adrenalin was given and enemata of extract of rhatany which resulted in cessation of the hemorrhages and disappearance of the purpura. A temperature persisted with marked fluctuations and loss of flesh and strength. In the course of an examination a tubercular process was detected in the lungs of which the child died in a short time. Autopsy showed a general miliary tuberculosis, infiltration of the lungs, cavity formations, purulent pleurisy and enlarged tracheobronchial lymph nodes, general intestinal ulceration, cheesy mesenteric nodes, the spleen and meninges studded with tubercles, and thrombosis of the dura mater sinuses. For some time writers have considered this pseudo-purpura as a complication of tuberculosis. A few cases have been reported; the pathogeny, however, is as yet unsatisfactory.

Pacyner, J.: Observations upon the Therapeutic Value of Thigenol in Dermatology. (*Der Kinderarzt*, June, 1904, p. 121.)

Thigenol contains sulphur, is synthetically produced and resembles ichthyol to which, however, it is said to be superior.

It is almost entirely without odor and taste, and does not cause stains; rubbed upon the skin it dries quickly, forming a thin, even and not sticky coating. It is cheaper than ichthyol. The cases

in which thigenol proves beneficial can be judged of from its properties. Applied to the skin, it induces contraction of the peripheral blood vessels which causes the relief of pruritus—a very important factor in eczematous conditions. It lessens inflammation and hastens the absorption of infiltrates; the skin becomes dry and denuded surfaces are protected. Finally the substance is antiseptic.

Having tried the remedy during one year in various forms of skin disease, the writer recommends it highly, believing that it will prove to be of lasting value.

Guidi, G.: Critical Review of the Theories as to Sudden and Gradual Weaning. (*Riv. di Clin. Pediatr.*, October, 1904, p. 721.)

The author's article is devoted to the refutation of the arguments of de Rothschild who, in a recent lecture, advocated the progressive method of weaning infants by substituting sterilized milk gradually for mother's milk. Guidi argues that it is far better to get the infant gradually accustomed to other forms of food (cereals, etc.), and after a time to stop the mother's milk. This stopping of the mother's milk may then be done suddenly, in one day, without the child being injured by the change. He begins to accustom infants at the age of six months to farinaceous food with milk, later at the eighth month to the yolks of eggs, etc. This feeding should constitute not a substitute, but an adjunct to mother's milk. The extraneous food is increased or decreased in quantity, according to the quality and quantity of the mother's milk and the appetite of the child. When the mother's milk is lacking in some way, breast-feeding should be alternated and supplemented with feeding with sterilized milk, but the sterilized milk should be given at the same feeding with the mother's milk, in order that the natural ferments of mother's milk mix with the artificial elements of cow's milk. After the sixth month, the infant should be gradually accustomed to eating from a spoon, and the nursing-bottle should be abandoned as soon as possible. At thirteen or fourteen months the mother's milk should be suddenly abandoned, and the child should be fed henceforth on the semisolid food to which he has grown accustomed. Weaning earlier than this is not indicated, provided the mother has enough milk for breast-feeding, combined, after the sixth month, with the other foods mentioned.

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Original Communications.

A CASE OF PULMONARY OSTEOARTHROPATHY LIMITED TO THE TERMINAL PHALANGES IN A CHILD; WITH A BRIEF CONSIDERATION OF THE RELATION OF OSTEOARTHRO- PATHY TO THE CLUBBED FINGERS OF CHRONIC HEART AND LUNG DISEASE.*

BY D. J. M. MILLER, M.D.,
Philadelphia.

In 1890 Marie first described, under the title "*De l'Osteoarthropathie Hypertrophiante Pneumique*," the skeletal disease characterized by thickening of the long bones in the vicinity of joints, with a peculiar clubbing of the finger ends, similar to, yet not exactly identical with, the ordinary clubbed fingers of chronic heart and lung disease. Because, in the cases described by him, the condition was secondary to some pulmonary affection, he appended the adjective *pneumique*, or pulmonary, thus adding to the length of a title already sufficiently cumbersome. Independently, and almost simultaneously (1889 and 1891), v. Bamberger reported a series of similar cases, which he thought depended upon hypertrophy and sclerosis of the bones. Since the appearance of these papers, many writers have discussed the affection, and many cases have been reported. The lengthy and somewhat misleading title, in spite of the appearance of several substitutes, has remained; probably because none has as yet been suggested that will adequately describe the multiple clinical features of the affection. Of all the substitutes, the name proposed by Arnold, secondary hyperplastic ostitis, seems the most appropriate, because the bone changes occur in other than pulmonary disease,

* Read by title before the American Pediatric Society, Detroit, Mich., May 31, 1904.

and the joints usually show no essential change. Osteoarthropathy is always a secondary disease; it has followed cystitis, pyelonephritis, syphilis, dysentery, chronic jaundice and other affections, while there are a few cases on record in which no primary disease could be discovered (Decloux et Lippmann, Stevens, *et al.*). By far the greater number, however, have occurred in connection with affections of the lungs (75 per cent., according to Whitman, and 70 per cent. of Janeway's collection of cases of the type of Marie and v. Bamberger). The forms of lung disease most commonly met with in osteoarthropathy are tuberculosis, bronchiectasis and other suppurative affections of the lung and pleura, although hydatids and malignant growths have been observed in a few cases.

The affection consists essentially in an ossifying osteoperiostitis limited usually to the distal extremities of the long bones (ulna, radius, tibia and fibula); less frequently of the carpal, tarsal and phalangeal bones. In severe cases the whole skeleton is affected, with kyphosis, usually in the lower part of the spinal column. The changes in the distal phalanges themselves are extremely slight, and are often not demonstrable even by the most careful radioscopy. In other cases a distinct osteophytic growth occurs, occasionally large cauliflower masses being observed at the ends of the phalanges. But the bony changes are not the only cause of the deformities observed during life; a large part of the alterations are due to thickening and swelling of the soft parts. The peculiar shape of the fingers, the characteristic clubbing, depends almost entirely upon hypertrophy of the soft parts. Radiography has taught us this. The same may be said of the swellings about the joints, which give the impression that the joint is affected, and to which the name arthropathy is due; much of this, doubtless, depends upon the enlargement of the bone ends, but much, also, upon hypertrophy of the soft parts. According to Freytag (Sternberg), the microscopic examination of the soft parts has thus far offered nothing of note.

F. R. Walters divides the affection into three groups: I. Typical osteoarthropathy, with peculiar form of clubbed fingers and changes in the long bones. II. Cases in which only the peculiar form of clubbed fingers exist. III. A mixed group, including all cases in which the enlargement of the extremities appears to have been primary, as well as others which are of uncertain nature. As a fourth group we would add the ordinary clubbed fingers of

chronic heart and lung disease, especially congenital heart disease, as the latter are certainly in close clinical and etiological relationship with osteoarthropathy. Sternberg regards the ordinary clubbed fingers as the lightest grade of the affection. Walters, also, considers the two conditions as closely allied, and remarks that the majority of cases have been associated with conditions that interfere with the aeration of the blood; again, v. Bamberger's cases show that valvular heart disease may cause changes in the bones as well as clubbing of the fingers. The clubbing of



PLATES I. AND II. PHOTOGRAPH AND RADIOGRAPH OF HANDS IN A CASE OF CONGENITAL HEART DISEASE, PATIENT'S AGE SEVEN YEARS.

the fingers in osteoarthropathy, however, is quite characteristic, and differs materially from that of chronic heart and lung disease (the so-called Hippocratic fingers). The nail is claw-like and curved in both its lateral and longitudinal diameters; it strikingly resembles the beak of a parrot, and, from hyperextension and enlargement of the terminal phalanx, it assumes the shape of a drum stick; hence the name "trommelschlägel finger." "The enlargement," observes Walters, "is mainly antero-posterior and dorsal, whereas in ordinary clubbed fingers it is lateral and palmar. Intermediate forms, however, occur." The nail, too, in osteoarthropathy, is rose red in color,

and is often striated and brittle, so that it splits readily, while in the Hippocratic finger the nail is apt to be blue and cyanosed. The difference between the two forms will be readily appreciated by comparing plates I. and II., from a case of congenital heart disease, with III. and IV., representing our own case of osteoarthritis limited to the finger ends. The deformity of the fingers usually occurs uniformly in all fingers and toes (Sternberg), although, as a rule, less marked in the



PLATE III. PHOTOGRAPH OF HANDS, CASE OF OSTEO-
ARTHRITIS, PATIENT'S AGE EIGHT YEARS.

latter. This form (that limited to the finger ends) is apt especially to occur with chronic suppurative lung diseases, and is more common in children, but has been observed in adults. In empyema the Hippocratic finger was considered by the older writers of diagnostic importance (Eustace Smith). They appear quickly in this affection, and disappear, or diminish, as the original diseases improve. Of such character were the cases of Gillet, Moizard and Moussons; all in children. According to Wunderlich, the clubbed fingers are seldom painful, as is usually the case with the swellings of the long bones.

While Freytag and Whitman regard the ordinary clubbed fingers as a distinct affection (and the peculiar shape of the osteoarthropathic finger would seem to support this view), we are inclined to believe with Janeway that it is "wise to consider the conditions as different stages of the same process until a case is found with the bone lesions and no clubbed fingers" (no case has as yet been observed without the drumstick finger), "or until a certain and different etiology is proven for the two manifestations."



PLATE IV. RADIOGRAPH OF HANDS SHOWING CHANGES IN THE TERMINAL PHALANGES IN CASE OF PULMONARY OSTEOARTHROPATHY, SAME PATIENT AS PLATE III.

As to the etiology and pathogenesis of osteoarthropathy, the views of v. Bamberger and Marie that the changes are due to the absorption of poisons from the seat of primary disease, whether that be pulmonary, or a general infection or chronic intoxication, seems, in the main, to be the most probable; although it will not apply to congenital heart disease, for which, however, venous congestion may possibly account." Janeway believes that this

factor has not been sufficiently accentuated, both as a cause of ordinary clubbed fingers, and as an accessory in the cases of pulmonary or other origin. Thorburn attributed the condition to a diffuse tuberculosis; and a small group were thought by Teleky to have a nervous source, a view which, Janeway says, has no substantiation.

Osteoarthropathy is exceptionally rare in children, *i.e.*, the type of Marie and v. Bamberger. Because he found no cases in a children's hospital, Lefebvre believed it was always an adult disease (Whitman). The most typical case of the type of Marie and v. Bamberger that we are cognizant of is that of Whitman: a girl, who developed Pott's Disease at the age of two; at five there was pertussis, followed by persistent cough and expectoration; at five and one-half years, enlargement of the finger ends was first noticed; this was so marked at the age of six and one-half as to attract universal notice; at eight years, thickening of the lower arms and swelling of wrist joints, characteristic clubbing, moderate kyphosis and rigidity of spine, and signs of tuberculous disease of the lungs. Field's case at seventeen months is regarded by Sternberg and Janeway as osteoarthropathy, by Arnold as acromegaly. Davis's boy of four and one-half years, who developed characteristic changes in association with empyema, one year after pneumonia, seems to be a genuine case. v. Bamberger reported a case at seven years, with pulmonary stenosis, congenital cyanosis, and tubercular lung deposits, and Thorburn refers to a post-mortem in a boy (age not stated), with thickening of the tibiæ, fibulæ, radii and ulnæ, with ordinary clubbed fingers, mitral stenosis and no lung disease. Gillet saw a typical case in a lad of thirteen, who had had repeated bronchitis since the age of four. We thus have only 5, or at most 6, typical cases of Marie's type in children.

Of cases in which the characteristic (parrot-beaked) changes were limited to the finger ends there have been reported in children: one by Moussons, a girl of fourteen, with empyema; 1 by Gillet, girl of seven and one-quarter, also with empyema; Moizard's 2 cases, a boy of six, and a girl of five, the first with purulent pleurisy and vomica, the second with empyema; Marfan's 3 cases, age not stated, one with empyema, one with bronchial dilatation, and one with cystitis and right bronchial dilatation; finally, Rotch and Dunn's case in a boy of three years and seven months. These observers, however, are in error when

they class their case as one of osteoarthropathy, because "it corresponds to the description given of pulmonary osteoarthropathy; that is, enlargement of the entire distal phalanges, involving primarily the bone itself"; since it has been abundantly shown that, even in typical cases, the distal phalanx itself is rarely affected, the deformity being almost entirely due to hypertrophy of the soft parts. When it does exist, however, we believe it places the case in the category of v. Bamberger and Marie, even should the characteristic clubbing not be present; a combination which, as yet, has not been observed.

If we class the ordinary clubbed fingers of chronic lung and heart disease as the lightest grade of osteoarthropathy, the number of cases occurring in early life will be greatly enlarged, as congenital heart disease alone would materially swell the list. Gillet believes that in childhood the affection is limited to the terminal phalanges, and displays little tendency to invade the larger bones; but Whitman's case apparently proves that, although this may usually be the rule, the Hippocratic fingers may occasionally develop into typical osteoarthropathy; in this case there was a period of five years between the first appearance of the clubbed fingers and the signs of implication of the long bones.

While our own patient was under observation we met with a boy of eight years, who had Pott's Disease and chronic bronchitis, with clubbing of the fingers slightly suggestive of the form peculiar to osteoarthropathy, but in whom radioscopy revealed entirely normal phalanges. It is our intention to observe whether the case which we now present, as typical of osteoarthropathy limited to the distal phalanges, will in time develop osteoperiostitis of the long bones and other features of the type of Marie and v. Bamberger.

F. W., a girl, was first seen at the age of eight years. She had been deformed since birth, but had become worse during the few months prior to admission. The family history was negative. There was marked kyphosis, embracing the first seven dorsal vertebræ, with a compensating anterior curve from the latter to the sacrum. The thorax was quite prominent, the ribs distinct and the sternum pushed forward. There was a marked rosary, distended abdomen, and emaciated arms and legs. The facial expression was that of an old woman. At this time, February 5, 1903, the condition of the fingers was not noted, although clubbing was probably present in some degree. The urine was normal; the

temperature 99° to 100°-101° F.; there was hectic, cough and signs of general bronchitis. After a long period in bed the child was permitted to go about with a jacket. The writer saw the patient first in February, 1904, about one year after admission to hospital. The clubbing at that time was marked and quite characteristic, the nails curved like a parrot's beak, elevated, of a rosy red hue and brittle. The fingers were long, and from hyperextension and enlargement of the terminal phalanges, resembled closely a drumstick. The following measurements were made:—

MIDDLE FINGER, LEFT HAND.		CM.
Circumference first phalanx	.....	4.1
“ middle “	.....	3.6
“ last “	.....	4.5
Length of nail	.....	1.2
Breadth of nail	.....	1.5
THUMB.		CM.
Circumference first phalanx	.....	4.4
“ last “	.....	5.1
Breadth of nail	.....	1.8
Length of nail	.....	1.6

The toes presented conditions similar to that of the fingers, but very much less marked. There was absolutely no thickening of the radii, ulnæ, tibiæ or fibulæ, both objectively and by means of radiographic pictures; the joints were entirely unaffected, nor had there ever been any pain in the latter or in the deformed fingers. The face was broad, and the head large and square, the molar bones prominent and the teeth carious. The child was quite anemic, the skin being of a peculiar muddy hue, but the blood count showed only a moderate secondary anemia: R. B. C., 4,250,000; W. B. C., 17,000; Hg. 52 per cent. Differential count: polymorphonuclear cells, 82.8 per cent.; large lymphocytes, 12.4 per cent.; small lymphocytes, 3.4 per cent.; eosinophiles, 1.4 per cent. The patient had had a cough for a long time; it varied in intensity, but was never entirely absent. Fever was also more or less constantly present, usually above normal, but occasionally falling below the latter point; as a rule, the diurnal range was between 99° and 100° to 101° F. The pulse was 100; respiration 28. The urine contained neither sugar nor albumin; no casts; specific gravity, 1.020; acid. An examination of the chest revealed the following: Heart dullness

extended from third rib to fifth interspace, nipple line (apex); right border at middle of sternum; sounds heard with great distinctness all over left chest; no murmurs. Lung dull at right supraspinous fossa, becoming quite clear as base is approached, and quite clear at base itself; at left supraspinous fossa slightly impaired resonance, remainder of right side, posteriorly, clear; at right supraspinous fossa feeble and distant bronchial breathing, similar to that heard over an effusion or compressed lung, increased voice and pectoriloquy, and a few crackling râles, elsewhere right lung shows harsh breathing and subcrepitant râles; at left supraspinous fossa harsh breathing only, no râles. Anteriorly, due to second rib on right side, with harsh breathing and no râles; at the left apex, in front, tympanitic note and bronchovesicular breathing, no râles. The liver extended a finger's breadth below the costal border; the spleen was enlarged and palpable. The pulmonary condition continued during the two months the child was under observation. How much the bronchial breathing heard at the right apex was due to compression from the greatly deformed chest, we are not prepared to say; but its character and persistence makes it quite possible that it had its origin in an old and healed cavity, or, possibly, to interstitial changes, the patient, at any rate, had a chronic bronchial catarrh, which may or may not have been tuberculous. No sputum could be obtained for examination. Equally uncertain is it to determine how much of the bony changes were the result of the pulmonary affection, on the one hand, and the chest deformity on the other; probably both contributed their share. The radiographs of the thorax were so unsatisfactory that the condition in the lung could not be determined by this method. Those of the hands, however, showed distinct periostitis of the terminal phalanges of the hands and feet, especially of the former, where definite osteophytic growths, somewhat cauliflower in shape, can clearly be seen, thus placing the case in the category of those true osteoarthropathies, in which the deformities are limited to the distal phalanges, in contradistinction to the closely allied, but not exactly similar, clubbed finger of chronic heart and lung affections.

NOTE.—After the proof of this paper had gone to the printer the patient died. The examination was limited to the thoracic and

abdominal cavities, permission to dissect the affected finger-ends not being obtained. There was marked interstitial pneumonia and purulent bronchitis, lesions sufficient to account for the phalangeal changes observed during life.

Abstract of autopsy by W. E. Robertson, M.D.:

Pleural adhesions both sides, especially about the apices, and between the bases and the diaphragm, interlobar adhesions also. Except at the apices, none of these were especially dense, nor was there thickening of the pleura.

Lungs.—Apices markedly fibrotic, and not compressible, no crepitation, interstitial pneumonia. This latter was certainly not pleurogenous in origin, but probably peribronchial, though sections have not yet been made. Signs of purulent bronchitis. No evident tubercles either in the lungs or peribronchial lymph nodes, but the latter were enlarged and pale. There were enlarged glands in the posterior mediastinum on the left side to which the apex of the lung was densely adherent. About this considerable fibrous tissue existed, possibly sufficient to act as an obstructive factor during life.

Heart.—No gross lesion except slight dilation. Mesenteric adenopathy. Liver and spleen enlarged. Other abdominal organs normal.

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Exanthemata Following the Injection of Diphtheria Antitoxin.—This question is discussed by Oberwinter (*Deut. med. Woch.*, Dec. 31, 1903), who describes several cases where an eruption followed the injection and was at first believed to be due to the antitoxin. Later developments showed, however, that they were cases of true scarlatina. He claims that an eruption which appears particularly from the third to the fifth day should always be viewed with suspicion, for he has found that in most cases it was genuine scarlet fever and probably due to a dual infection with both diseases. The fact that the eruption begins at the site of injection is apparently no proof of its being due to the serum, although the author does not deny that a true serum exanthem may assume the form of a scarlatinal eruption.—*Medical News*.

THE ACUTE PYELITIS OF INFANCY, WITH REPORT OF A CASE.*

BY ROWLAND GODFREY FREEMAN, M.D.,

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Any disease of infancy which can pass unrecognized, while under intelligent observation for several weeks, on account of the absence of local symptoms pointing to its location, deserves to be called frequently to the attention of the profession in order that the characteristics of its manifestations may be familiar, and that subsequent cases may not be overlooked. This is particularly true of any disease which will continue indefinitely without specific treatment, but may be readily cured by the use of appropriate remedial agents.

The acute pyelitis of infancy is a disease of this sort. Its rarity is sufficiently emphasized by the fact that Holt has reported only 3 cases; Heubner, 2 cases; and Thompson, of Edinburgh, 8 cases.

The etiology of most of these cases is very indefinite. The fact that a large proportion of the cases have occurred in female children makes it seem probable that the infection is often through the urethra while the organism associated with most of the cases, the bacillus coli communis points to an infection originating from the alimentary tract, as does the fact that many of the cases follow intestinal disorders.

The clinical manifestations give no indication that the pelvis of the kidney is the source of the trouble. They usually have abnormal movements from the bowels, associated with a high temperature of irregular type with marked remissions and followed by rapid elevation, which in some cases is accompanied by chills. There is thus a great likelihood that these cases may be treated as cases of intestinal disorder associated with a high temperature, or that they may be considered of malarial origin.

The procuring of a specimen of urine from an infant involves some difficulty for those unaccustomed to work with these little ones, so that this one method of making a diagnosis in this condi-

* Read before the Sixteenth Annual Meeting of the American Pediatric Society, Detroit, Mich., May 31, 1904.

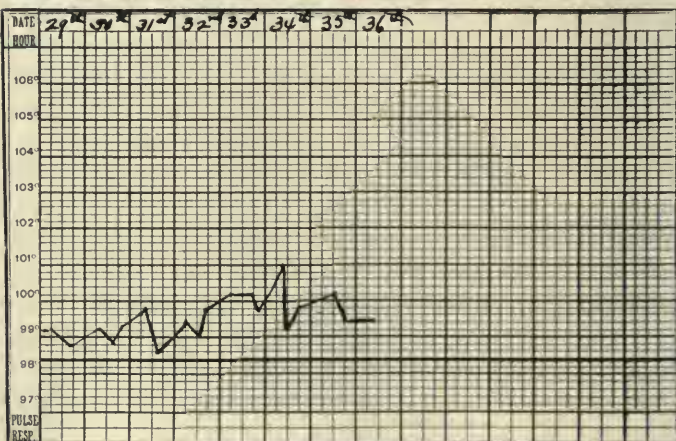
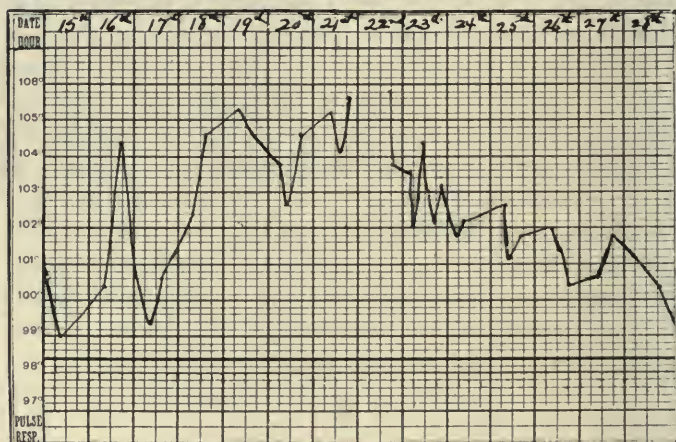
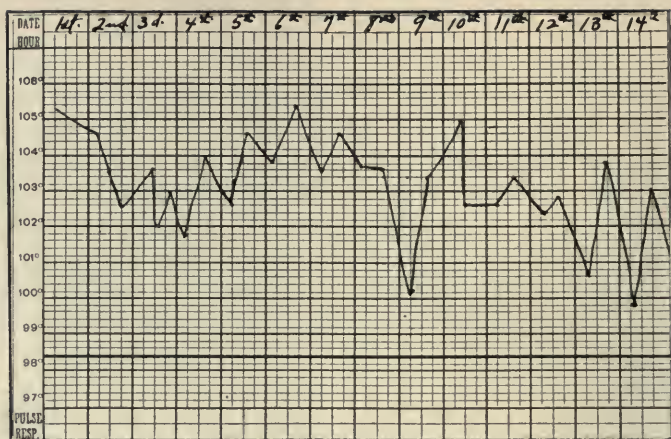
tion is very apt to be neglected, and, again, pain referred to the region of the kidneys is not a symptom that can be relied upon in infancy. On this account it has happened that many of the recorded cases have been allowed to progress for long periods before curative treatment has been used. This is the more unfortunate since the curative treatment is very simple and safe—the administration of alkalis in order to neutralize the reaction of the urine from the extreme condition of acidity always found in this disease—such treatment, so far as I know, having always affected a moderately rapid cure.

The following case seems of interest since it occurred in a male infant which, on questioning the mother, was found to have shown some evidence of urethral irritation at the beginning of the attack, which attack was preceded by two or three weeks of slight digestive disturbance as indicated by abnormal stools. This child continued sick for three weeks, with an irregular temperature which, toward the end of this period, remained constantly very high and was associated with nervous symptoms, such as twitchings and stiffness of the back of the neck. As soon as remedial treatment was instituted, on the twenty-second day of the disease, the temperature steadily declined until it reached normal on the twenty-ninth day. The child has since steadily gained in weight and become perfectly healthy.

A detailed history of the case, with the results of the examination of the blood, follows:

History.—Male child, eight months old, fairly nourished, suffered from slight digestive disturbance for three weeks, after which it was suddenly taken very sick on the eighteenth of February and had a high fever, 105.2° F., and its movements became green. Its food was stopped, it was given calomel and all the water it wanted. During the following twenty days the child was fed for the most part on barley-water and egg-albumen water. The administration of milk was usually followed by a higher range of temperature. Medication was directed for the most part to the correction of gastroenteric symptoms and the reduction of temperature; the medicines used were calomel, castor oil, bismuth, aconite and acetanilid and brandy. Irrigation of the bowels was used occasionally. The variation of the temperature may be seen on the chart.

Twenty-second day.—On this day the baby was brought to me for treatment. It now has some color in its cheeks, which are



TEMPERATURE CHART OF A CASE OF ACUTE PYELITIS OF INFANCY.

thin, and it has a large, broad forehead. Head circumference, 42½ cm. Chest, 41½ cm. It has had some twitchings of the face and has cried out in its sleep. There seems to be a little stiffness of the back of the neck. Ears negative. Respirations 80, but there is no swinging of the *alæ nasi*. No expiratory grunt or pause between inspiration and expiration. The lips are somewhat cracked, the tongue is very slightly coated. The cervical lymph nodes are not enlarged. The heart and lungs are negative. The liver is not enlarged, spleen is not enlarged, abdomen is not distended. No diagnosis was made. The urine and blood had not been examined. Ordered 3 drams of castor oil, 1 grain quinin, bisulphate in solution every two hours. Milk stopped, a proprietary food ordered. Evening temperature, 105.7°F. A bath at 95°F. ordered, temperature reduced to 103.8°F.

Twenty-third day.—Morning temperature 102°F. Urine acid, specific gravity 10.10, contained a large amount of pus, very few hyaline casts with trace of albumin.

Blood examination by Dr. F. C. Wood: 3,900,000 red corpuscles, 70 per cent. hemoglobin, 13,000 white cells, 67 per cent. polynuclear neutrophiles and 33 per cent. lymphocytes, large 2 per cent., small 31 per cent. No eosinophiles or mast cells seen in 200 leukocytes. No nucleated red cells found. The baby had been sleeping for four hours, so had no digestive leukocytosis.

During this day the baby had a considerable stupor and in the morning a rise of temperature to 104.4°F. Ordered urotropin ½ grain every four hours. Ordered irrigation of bowels every morning and poultices twice a day over kidneys.

Twenty-fourth day.—Baby had a fair night, has taken 11 ounces of nourishment. Ordered solution of citrate of potash continued, 2½ grains every two hours to eight doses in twenty-four hours. Temperature to-day not above 102.5°F. Urine now alkaline, but amount of pus four times as great as yesterday.

Twenty-fifth day.—Temperature lower and amount of pus in urine much less than two days ago. Urine planted in agar and pure culture of *bacillus coli communis* obtained.

Twenty-sixth day.—Temperature ranges between 99.4° to 102°F. Child brighter, but hands are cold and heart intermits every third beat. Ordered urotropin stopped. Child put on modified peptonized and pasteurized milk containing 3 per cent. fat, 6 per cent. sugar and 2 per cent. proteid.

Twenty-seventh day.—Temperature range much the same as

yesterday. Child seems brighter. Pulse regular. Respirations still 60 to 80. Pulse 120. Amount of pus in urine markedly less. Ordered one dose of $\frac{1}{2}$ grain of urotropine at night.

Twenty-eighth day.—Heart skips every third beat, hands cold and bluish. Abdomen distended. Movements contain large curds. Stopped urotropin, ordered 2 drams castor oil. Stopped modified milk, ordered proprietary food. Toward evening child seems more comfortable. Temperature 100.4°F. Twelve ounces of nourishment taken.

Twenty-ninth day.—The castor-oil was followed by a large movement containing much mucus and large curds and after this the child rested much better. Respirations 62 to 80. Pulse 120. Temperature about 99°F. Urine clearer. Ordered citrate of potash 5 grains eight times a day. Sixteen and one-quarter ounces of nourishment taken. From this time the child was kept on the citrate of potash and fed with modified milk, of which it took daily an increasing amount until on the thirty-seventh day it took 36 ounces. Some leukocytes persisted in the urine. The respirations continued about 70 a minute. The parents were then advised to take it to their home, the same treatment being kept up. It has continued to improve without any remissions.

DISCUSSION.

DR. MORSE.—It seems to me that the frequency with which we meet this disease depends upon the frequency with which we examine the urine. For several years I have made it a routine practice to examine the urine of every baby not only at the hospital, but also in private practice. During this period I have had from 2 to 4 cases of acute pyelitis in every service. Even with an examination of the urine I believe that the diagnosis is often rather difficult. Very often an acid urine is found containing a great deal of pus and very little else. In such cases it is very hard to tell whether the pus came from the kidney or from the bladder. In the cases in which there are squamous cells I suppose the trouble is in the bladder; when there are spindle or caudate cells I believe that the trouble is either a pyelitis or a pyelonephritis. The presence of casts of course confirms the diagnosis of pyelonephritis. It is my impression that most of these cases are due to the colon bacillus.

During the past few months I have seen 2 cases which have opened a new field to me. In 1 case pus was found in the urine and a cystitis rather than a pyelitis was suspected. Dr. Rotch, who

saw the case in consultation, suggested the possibility of tuberculosis. Further examination disclosed bacilli in the urine, which answered all tests for the tubercle bacillus and killed guinea-pigs. Later developments showed that the trouble was undoubtedly located in the kidneys. In the second case, also, tubercle bacilli were found associated with pus without other cellular elements or casts. I have found little difficulty in obtaining specimens of urine from babies, especially in hospital work. For the boys a small, wide-mouthed bottle is used and found very satisfactory. Various methods are used for obtaining the urine from little girls, among these, short confinement in the Bradford frame, a soft ring lined with dental rubber to make a basin, and a peculiarly shaped tin receptacle.

DR. ABT.—Several years ago Escherich and his students studied colon bacillus infections of the bladder and they reported quite a number of cases. Some of these infections followed intestinal disease, more particularly follicular enteritis.

The colon bacillus probably enters the urinary organs from without, or through the vascular or lymphatic systems. Since the report of Escherich's cases appeared, the number of reported cases of pyelitis and cystitis is increasing in the literature. During the past winter I saw a case very similar to Dr. Freeman's, which was of great interest. The patient, who was less than a year old, and had been previously well, was taken severely ill three weeks before I saw him, with a high temperature frequently reaching 105° or 106° F. The temperature was irregular in character. Some days it was intermittent and other days remittent. The little one was desperately ill; the emaciation was extreme and prostration was marked. The examination of abdominal and thoracic organs was negative, though the urine, which was acid in reaction, contained large quantities of pus, a few hyaline and occasional granular casts. The interesting feature about the urine, which was brought out in the bacteriological examination by Drs. Le Count and Weaver, was the finding of a bacterium which resembled in many of its morphological characters, the Shiga bacillus.

The illness ran a protracted course. The infant continued feeble for a long time, but eventually recovered. Treatment consisted in the administration of urotropin and salol, in 1-grain doses.

Another case was that of a little three-months-old baby who was sent into the hospital because it had very high fever and purulent urine. The urine contained hyalin casts and colon bacilli; it was acid in reaction and contained pus. The right kidney was prolapsed, though not movable, and could be readily felt through the abdominal wall. The child emaciated very rapidly, the pus did not diminish in amount and death occurred at the end of about two weeks.

Autopsy showed an anomaly of the urinary apparatus; on both sides double ureters were present. The bladder presented a diverticulum and the left kidney was the seat of extensive pyonephrosis with pyelitis and some involvement of the ureter.

DR. ROTCH.—Infection by the tubercle bacillus is an interesting condition. The fact of its being so often discovered with so much difficulty gives evidence of the latent character of the affection. In cases I have seen in hospital and private practice the disease seemed to be extremely latent and even when the presence of tubercle bacilli was not proved the clinical symptoms often extended over a period of weeks.

DR. DORNING.—I think the Society, in discussing this subject, cannot lay too strong emphasis upon the importance of examining the urine in every case of disease. Another method of obtaining the infant's urine should be mentioned, namely, by means of a clean, soft rubber ice-bag adjusted so that its aperture includes the genitals, and then held in place by tapes fastened around the baby's waist and under the perineum. Many years ago Dr. Jacobi had presented to the profession a small metal catheter about size No. 3, English (No. 9, French), made in two sections to be carried in the ordinary pocket case. It had become so popular at my clinic, where I have been in the habit of demonstrating its use that an instrument-maker in the neighborhood obtained the pattern and in a short time disposed of several hundred of them. In the use of a soft rubber catheter it is important to select one of good quality, particularly on account of its small caliber. I recall one case in which a poor rubber catheter broke during its withdrawal from a male urethra, leaving an inch of its tip in the bladder.

The diagnosis of pyelitis is not always easy, the clinical symptoms being at times somewhat vague. Now and then I have found pyelitis giving symptoms that led me to suspect bladder difficulty, such as frequency in urination and distress at the neck of the bladder. Examination in some of these cases showed a normal bladder, but later on the evidences of pyelitis became more distinctive. I think one should suspect a tuberculous condition in the majority of cases of pyelitis. As already mentioned the condition is often found to be latent. Very often the microscopical examination does not help us, and, not infrequently, the inoculation of guinea-pigs will give negative results. With regard to the use of urotropin there is one point in connection with Dr. Freeman's case that I would consider, and that is the use of an alkaline salt to neutralize the acidity of the urine at the same time he was giving urotropin. I think it is now generally acknowledged that urotropin acts as a urinary antiseptic only in acid urine, and, hence, to obtain this effect it was well to render the urine slightly acid by administering sodium benzoate in conjunction with urotropin when the indication exists. I would ad-

vise careful observation in cases of prolonged administration of urotropin as it sometimes has an irritating effect upon the bladder and kidneys. I have seen some patients who could not take urotropin at all. In two children I have been unable to give even $\frac{1}{2}$ grain doses for more than a brief time, and in two adults 2 grain doses could not be taken without developing marked bladder distress.

DR. CRANDALL.—I should like to ask Dr. Freeman about the ultimate effects of such cases of pyelitis, and the susceptibility of the kidneys. Scarlatinal nephritis may disappear entirely and yet leave behind an increased susceptibility to kidney trouble in later years. Does a pyelitis leave such an increased susceptibility behind? I have 1 case which I have watched for nine years but, up to this time, absolutely nothing could be referred to the kidneys and the cure seems to be complete.

DR. HOLT.—I have one patient who has been well now nearly nine years following an attack of acute pyelitis, and another is well who had an attack eight years ago. The attacks were in both instances severe. The urines were examined at intervals in both cases for several years; but no relapse occurred, and no sequelæ followed.

DR. JACOBI.—A great deal is heard upon this subject and evidently very little impression is made on the general medical public; it takes a great deal of hard hammering to get things into the heads of all of us medical men. Pyelitis has been up a number of times for discussion and then is forgotten. If the urine is examined in every doubtful case more cases of pyelitis or pyelonephritis will be found. There are certain diagnostic points which are correct. If there is pus and a great deal of bladder epithelia in the urine it is reasonable to suppose that at least a part of the pus and epithelia come from the bladder. Again, if there is much renal epithelium in the urine, with hyalin casts and only now and then a small granular cast, it points to the kidney as the seat of trouble. In some cases we get blood and pus from the kidney and this indicates a pyelitis. In cases of pyelonephritis there are more kidney elements to be found than in a simple pyelitis. I have not infrequently been called to see cases of protracted fever in which the unfortunate diagnosis had been made of malaria, and brief examination revealed either a pyelitis or a nephritis. This is a subject that is always being forgotten; that pyelitis is a disease frequently found in young infants. In every doubtful case, where there is fever the urine should be carefully examined.

I am not fond of urotropin, although many children may take it well. I recall a child of three or four years old in whose urine uric acid fell down in amorphous masses. Urotropin was given a number of times and the result was that each time the uric acid no longer appeared in such masses but came down in crystals. A.

remedy I like, not in the acute stage, but in the subacute and chronic stages of the disease, is gallic acid in fair doses; this is well tolerated; I remember but 1 case in which it was not tolerated. Adults can take from 100 to 180 grains a day, and a one-year-old child can take from 5 to 10 to 15 grains, even up to 20 grains daily, without disturbing the digestion. Tannic acid must not be substituted; it is not well borne.

It is difficult to discover tubercle bacilli in the urine in most cases. Those cases which are the result of bacterial infection will get well as a rule; but those resulting from stone are of a different nature.

DR. FREEMAN.—At the Foundling Hospital, in New York, the urine of young children is always examined as a routine practice, but cases of pyelitis are rarely, if ever, seen there. There is no difficulty in obtaining specimens of urine from even the youngest children. The methods mentioned by Dr. Morse may be used or, as in the case I have reported, the mother or nurse watches the child and when he or she urinates they use the cup.

My impression is that these pyelitis cases, when they recover, recover slowly and relapses do not occur.

Urotropin was used in my case before the citrate of potassium.

Albuminuria of Puberty.—It is not generally known that a large percentage of boys from fourteen to eighteen years of age suffer from albuminuria without having nephritis. F. LOMMEL (*Deutsch. Arch. f. klin. Med.*, Vol. 78, Nos. 5 and 6) had the rare opportunity to examine repeatedly over 500 young employees of a large factory and discovered albumin in no less than 19 per cent. In most cases, only traces could be detected, though in a few the amount exceeded 1 pro mill. The greater part of the albumin seemed to consist of globulin as in acute nephritis, indicating the presence of wide meshes in the filtering apparatus of the kidney. The cause of the albuminuria, which generally had an intermittent character and was orthostatic in type was to be found in an impoverished condition of the blood, together with a mild degree of cardiac insufficiency and tendency to stasis, such as is liable to occur during puberty where the rapid growth of the body is out of proportion to the functional powers of the internal organs. In accord with this, dilatation of the heart, tension of the arteries and accentuation of the second aortic sound were frequently noted. The condition is readily outgrown, since it was not found in any of the men above twenty-five years old of the same factory. It is often difficult to distinguish from chronic interstitial nephritis, but the slight amount of albumin, the rare occurrence of casts of hyaline character and the distinct intermittent type speak against the latter. Moderate cardiac changes are of no value as they occur in both.—*Medical News.*

LESIONS OF THE UPPER AIR PASSAGES DUE TO HEREDITARY SYPHILIS.*

BY J. CLARENCE SHARP, M.D.,

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For a number of years I have been much interested in a class of cases in children that show lesions in the upper air passages due to hereditary syphilis. My attention was directed to these cases because of the general, if erroneous, belief of the profession, that if a child shows no evidence of hereditary syphilis during the first six months of its life, it will not, in all probability, succumb to the disease. The fact is overlooked that the mother of the child may have been treated for syphilis during pregnancy and continued the treatment after the child was born, thus delaying it temporarily.

It has been my habit for years, both in my private practice and in my clinic at the Presbyterian Hospital, to give a course of anti-syphilitic treatment to all young children with *hypertrophy* of the cervical and submaxillary nodes. Under this treatment the glandular hypertrophy disappears and the children begin to improve both mentally and physically. I do not mean to imply that all children suffering from enlarged cervical nodes are victims of hereditary syphilis; but that many of them are, is certain. By giving these children the antisiphilitic treatment early, they are rendered less susceptible to serious illness, for the power of resistance in these syphilitics is so reduced that they easily become victims to disease. Also, abscesses of the nodes, or even gummatous deposit of the upper air passages may form, and when the physician sees these cases he is apt to make an erroneous diagnosis of *tuberculosis*.

It has always been my habit to impress on the minds of all students of medicine that syphilis is a disease that remains dormant in patients for years. Healthy children may be born to these

* Candidate's Thesis for Membership in the American Laryngological, Rhinological and Otological Society at the meeting held in Chicago, May 31 to June 2, 1904. Read before the Northwestern Medical and Surgical Society, New York, December 17, 1904.

people; later, when one of the parents suffers a relapse, a child is born into the world—a syphilitic. Again, the next conception may result in a healthy child, while the child following the healthy one may show signs of hereditary syphilis. The parent at this time may be innocent of having any recurrence of his old disease.

We are often called upon to make a diagnosis of syphilis from very slight clinical evidence, such as the roughened and corrugated condition of the tongue, with here and there a white patch, suggestive of leukoplakia. Such a case was brought to my attention several weeks ago in my clinic at the Presbyterian Hospital, when Dr. A. F. Büchler brought a young boy to me because of this peculiar condition of the tongue. After examining the tongue I said I had never seen this condition of the mucous membrane except in syphilis, and more especially in the hereditary stage. In questioning the boy I learned that he was a former patient of mine at Bellevue, when he had come under my care when two weeks old. His father was suffering from tertiary syphilis when the mother conceived, and died when the baby was four weeks old. I found the same condition of the mucous membrane of the tongue in the older brother, who showed marked evidence of intense poisoning in his lymphatics, with poor mental and physical condition.

The idea seems to be deep-seated in the minds of physicians that the presence of Hutchinson teeth is necessary to a diagnosis of hereditary syphilis. My clinical experience has been that not more than 1 per cent., certainly not more than 2 per cent., of the children suffering from hereditary syphilis, show Hutchinson teeth, and no one should hesitate to make a diagnosis and give the proper treatment when the Hutchinson teeth are absent. Pediatricians and text-books on diseases of children, as a rule, pay little attention to the clinical appearance of the throat lesions, in formulating a proper diagnosis, and, consequently, physicians often overlook the symptoms of hereditary syphilis. An ulceration is seen in the nose or pharynx, and at once a hunt is begun for enlarged glands, Hutchinson teeth, and history of infection. The possibility that a child may have a gumma of the soft palate, or of the nasal septum, without any noticeable infiltration of the neck, is not taken into consideration.

This ignorance of the appearance of lesions in the upper air passages is true, also, of the general surgeon. Several years ago I visited the operating room of a large hospital after leaving the clinic, and saw a boy of five being prepared for operation. He

was to have the necrosed part of the ramus resected. Fortunately for the little fellow I recognized him as the child of a family of syphilitics. The surgeon was informed of the fact, and requested not to operate. The child was put to bed and the proper treatment instituted. The necrosed bone gave way to healthy bone, the sinus healed, and the child was saved from disfigurement for life.

Several years ago a little girl of ten years was sent into the service of Dr. H. A. Haubold at the Harlem Hospital for operation, with a fistula of the trachea of two years' standing which discharged abundantly. I was asked to examine the child and found a fistula at the first ring of the trachea. The fistula ran in an upward direction to the larynx. No ulceration could be seen upon laryngological examination. A diagnosis of hereditary syphilis was made in this child, antisyphilitic treatment was given, and the patient left the hospital in a short time. I discovered that at this time I was treating a younger sister of this patient at the clinic. She was suffering from periostitis of the femur and knee joint, and was just beginning to walk again. Several years before I had treated the mother of these children for syphilis.

Great care must be exercised in inquiring into the history of these cases, especially in asking about the health of the father. In the clinic these children are generally brought by the mother, whose suspicion is very easily aroused when too close inquiries are made, or a hint dropped that the disease is inherited. If the parents of the little sufferer are of the wealthy and more educated class, it often happens that we cannot make any inquiries, and a diagnosis must be made from the clinical picture alone. One does not often hesitate to ask a man when he had syphilis, but feels some reluctance in accusing the wife of having had the disease when she is the one to be blamed. I have a mother and baby now under my care, suffering from syphilis. The woman has been married six years. Ten years ago she contracted syphilis, and for a short time underwent treatment. Ten years later, while suffering from a gumma of the nose, she was unfortunate enough to become pregnant when the disease was at its height. She was placed under vigorous medication, the baby was born at full term, but it shows evidence of the disease. It is in these cases that we must protect the guilty one, and not destroy the confidence and love of the other.

My clinical experience leads me to believe that a great many

post pharyngeal abscesses are caused by hereditary syphilis. These abscesses occur mostly in children, and while no doubt some are caused by tubercular deposit, all that I have seen yielded more readily to antisyphilitic treatment than to anything else.

I remember one little girl who was brought to the clinic, suffering from a post pharyngeal abscess, which was opened through the pharynx. The child made two or three visits and then disappeared only to return eight weeks later with a larger abscess which was opened. On pressure, pus not only ran out of the wound, but discharged through the ear by way of the Eustachian tube. By this time the patient's mother was thoroughly frightened, antisyphilitic treatment was given, and the child made a complete recovery.

All cases of pharyngeal abscess I open by way of the mouth, and if the child has no evidence of tuberculosis, treat it as a case of hereditary syphilis. I have never seen a post pharyngeal abscess in which it was necessary to make an external opening. If the general surgeon would pay more attention to these cases of hereditary syphilis, and would call in a laryngologist and follow his advice, he would submit but few of these children to a major operation.

The clinical appearance of ulcerations in hereditary syphilis in the mouth and pharynx differ very slightly from that of a tertiary ulceration, except that in the latter there is more infiltration of the surrounding tissues.

An interesting example of this was brought to my clinic at the Presbyterian Hospital a short time ago in the case of a three-months-old baby. The mother noticed that the baby swallowed with difficulty, and some of the food regurgitated through the nose. The baby was bottle-fed, weighing six pounds. The child was fretful; the facial expression one of anxiety; did not sleep well and had been losing flesh since it was four weeks old. For the last three weeks has not been able to swallow so well. Examination showed some infiltration of the right submaxillary and cervical glands. A small perforation was seen of the *soft* palate on the right side of uvula. The mucous membrane about the perforation was intensely red; no edema of the uvula or surrounding tissue; tonsil, anterior and posterior pillars of pharynx in normal condition. The mother has had four children, all of them healthy, except this one.

Diagnosis.—Perforation of the soft palate due to hereditary

syphilis. Treatment: Five drops of the saturated solution of potassium iodid to be given in its food three times a day, with instructions to increase one drop every day until it was taking 15 drops *t. i. d.* The mother reported that in forty-eight hours the child began to swallow better, and in two weeks' time the perforation was entirely healed, leaving only a small white scar. The baby was then put upon inunctions of blue ointment and is now getting fat.

The clinical appearance of ulcerations of the larynx are somewhat different. The ulcer looks more like the old chronic ulcers seen on the legs of elderly people, with thick indurated edges covered with granulations. These ulcerations in the larynx heal much less readily than the ulcerations in the nose and pharynx, and there is always the danger of sudden relapse, even while they are under most careful supervision. Such a case has been under my care for the past five years.

J. H., age twelve years, small of stature, has been failing in health for some time, looking worse every time he returns from school. Has been gradually getting worse for six months. Mother had twins eighteen months after marriage. One child lived one year and the other eighteen months. One year and a half later she gave birth to another child which lived only a few minutes. The babies were well formed, with no marks upon their bodies. One year later this boy was born. Cervical and submaxillary glands were hypertrophied. He gave no trouble when a baby and was in good health until eleven years of age. Father died five years later in Hot Springs, from cerebral syphilis. Examination reveals the cervical glands hypertrophied, the submaxillary glands the size of a walnut, voice husky, boy speaking in a shrill whisper. Mouth, pharynx and teeth in fine condition; tongue surface roughened; tonsils very small; epiglottis infiltrated, ulceration extending over free border with partial destruction of left side. Larynx shows arytenoids thickened with ulceration of the inter-arytenoid commissure and left cord. Such laryngeal cases as these require the most careful attention. The irritation caused by iodids makes it often necessary to discontinue their use for a time, substituting in their place some form of mercury until the irritation is reduced.

I was recently asked by Dr. Irving S. Haynes to examine a case in the isolation ward of the Harlem Hospital, with the following history: Dr. Krauskopf, the ambulance surgeon, brought

in an emergency case, a child twelve years old, almost moribund. The mother reported that the child had been in bed for three days, when breathing suddenly became very difficult. The child was rushed to the hospital and a tracheotomy tube inserted. The case was thought to be one of laryngeal diphtheria. A culture was taken and the Board of Health reported negatively. Four days later I saw the child. She was then running a temperature and the tracheotomy wound was suppurating.

No examination of the larynx could be made because of the edema of the epiglottis. I advised Dr. Haynes to open the trachea in order to see the cause of the obstruction, because as soon as the tube was removed the child stopped breathing. He was reluctant to do this, on account of the suppuration. Several days later I was able to examine the larynx, and found a large gumma of the inter-arytenoid commissure and ulceration of the left arytenoid cartilage with syphilitic infiltrations around the tracheal wound. Under vigorous antisyphilitic treatment the tracheal wound at once healed, the child left the hospital in ten days, and now, six weeks after her entrance to the hospital, the arytenoid has healed, and only a small ulceration is seen in the inter-arytenoid space. We learned later that the child had had an attack of *dyspnea* lasting four or five days, three weeks previous. This child's difficulty was due to the presence of the gumma in the inter-arytenoid commissure, which also prevented the insertion of the intubation tube.

Gumma of the trachea is rare, and fortunately so, because of the difficulties in the way of diagnosis, and of the danger to the patient not only from suffocation during the formation of the gumma, but also from the cicatricial tissue which is sure to follow the active ulceration.

When a child presents itself with a history of dyspnea, a differential diagnosis must be made between papilloma of the trachea, tubercular infiltration or abscess, and gumma.

The history for diagnosis of papilloma will be as follows: Dyspnea has extended over a period of several months, with a gradually increasing difficulty in breathing; loose cough generally present, the trachea filling up with mucus; attended perhaps by severe attacks of bronchitis. The general health in these cases is not bad.

In tubercular abscess or infiltration a history of tuberculosis in some other part of the body will be found. The general cachexia in the patient would help clear up the diagnosis.

With *gumma* the difficulty in respiration occurs at intervals. The history will show that the dyspnea has existed for ten days or two weeks, and that the paroxysms of coughing are brought on by the least exertion. These little patients suffer more toward night. When put to bed, they lie with head elevated, and are restless during the night, but improve toward morning, when they will often fall off into a quiet slumber. As the *gumma* increases in size, the breathing becomes more labored, the child has an anxious expression and hard cough with little expectoration. A very interesting case of this kind was brought to the clinic at the Presbyterian Hospital, October 30, 1903.

M. W., age five years. Mother noticed difficulty in breathing some time in August. The child was treated at home. His breathing gradually became worse, giving him the most trouble the fore part of the night, when he would almost suffocate. At the clinic he could be heard across the room, so marked were his efforts to breathe. Examination of the mouth showed no Hutchinson teeth; pharynx was normal; epiglottis infiltrated and partially paralyzed. Left arytenoids showed slight infiltration with very limited motion; true cords not congested. In the trachea a tumor, extending beyond the median line, could be seen, which remained stationary during inspiration. A diagnosis of *gumma* was made and the child at once put upon antisyphilitic treatment, with marked improvement inside of forty-eight hours. This patient was given 5 grains of potassium iodid, three times daily, the dose rapidly increased to 25 grains. In less than one week he was able to sleep without any extra pillows. The infiltration and paralysis of the epiglottis have disappeared, the tumor is gradually decreasing in size and the trachea will soon be normal.

It is really marvellous how quickly the iodids give relief in these cases of ulcerations. In twenty-four hours improvement can be seen, if the physician is not afraid to push the iodids.

It may be said, in conclusion, that we have ulcerations of the upper air passages, due to hereditary syphilis, when none of the classical symptoms which the physician is apt to consider necessary to a diagnosis of the disease are present, *viz.*: Hutchinson teeth, keratitis, and the frog-like appearance of the face due to the flattening of the bridge of the nose.

62 West Forty-sixth Street.

- I. PARALYSIS OF DIAPHRAGM AND SOFT PALATE (DIPHThERITIC?): RECOVERY: SEVERE DYSPNEA; RESPIRATION ENTIRELY COSTAL.
- II. PARALYSIS OF COSTAL RESPIRATORY MUSCLES: ACUTE HEMORRHAGIC MYELITIS; DEATH IN THREE DAYS: DYSPNEA; RESPIRATION WHOLLY DIAPHRAGMATIC.
- III. DYSPNEA: OBSTRUCTIVE AND NOT NASOPHARYNGEAL NOR LARYNGEAL, BUT DUE TO ACCIDENTAL PRESENCE OF AIR IN THE PLEURA, PROBABLY DUE TO THE FAULTY METHODS OF NEEDLE EXPLORATION, IN A TUBERCULOUS LUNG.*

BY W. P. NORTHRUP, M.D.,
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Intubationalists are especially interested in the different varieties of dyspnea. I shall call attention to some unusual types, for I am forced to believe that, even yet, general practitioners will call for intubation in pneumonia without laryngeal obstruction, in retropharyngeal abscess, and I have just learned how urgent diphtheritic croup may be mistaken for severe pneumonia.

Dyspnea of peripheral nerve origin, neuritis presumably diphtheritic, paralysis of diaphragm, is the first type.

Dyspnea of central origin, infectious transverse myelitis and paralysis of the thoracic muscles of respiration, is the second type.

Dyspnea, obstructive and not from stenosis of the nasopharynx, nor yet of the larynx, but due to accidental presence of air in the pleura, probably due to faulty exploration by needle, is the third.

- I. PARALYSIS OF DIAPHRAGM AND SOFT PALATE (DIPHThERITIC?): RECOVERY: SEVERE DYSPNEA; RESPIRATION ENTIRELY COSTAL.

A girl, ten years old, was brought to the Presbyterian Hospital in great prostration and severe dyspnea. There was no history nor evidence of diphtheria, no bacilli grew from nose or mouth culture, no albuminuria. She had previously been in good health, not subject to sore throat. All history was unsatisfactory, and, with reference to diphtheria, negative.

* Read before the Sixteenth Annual Meeting of the American Pediatric Society, Detroit, Mich., June 1, 1904.

Four days before entrance she complained of pains in the legs. On account of these pains she remained home from school, and her mother relieved them somewhat by rubbing with alcohol. She was not in bed, simply remained at home. There was no history of exposure.

On the day before entrance she complained of pain in the left side, and cough. It was not known that she had a chill. She was put to bed, the breathing became hurried and difficult, presumably on account of the pain in chest, no signs of consolidation.

On entrance these were the notes of her condition:

Pain in one side, dyspnea and cough; much prostration; extremities cold; pulse almost imperceptible; no cyanosis.

The child was poorly nourished, anemic, breathing quietly when undisturbed, and pretty comfortable. She was very dirty and neglected, and the points of her history were in harmony with the general slovenliness of her home surroundings. She could easily have had a mild diphtheria and not been observed.

I was asked to see this case in the Accident Ward. There was something unusual about the case and the house staff wished me to assume the responsibility of receiving her into the wards.

Here is a brief record, after looking backward over the case, and omitting all history irrelevant to the diagnosis: General appearance: She lay on her back, prostrated, quiet and comfortable when undisturbed, very serious looking, apparently just about able to keep up with the needs for breathing when everything was going favorably. At my approach she scowled, turned her head away, shut her eyes and showed signs of dyspnea. She was frothing at the nostrils and mouth corners, there was a moist rattling in the pharynx and trachea, a "death rattle" on respiration, and occasionally a sort of effort at clearing her throat. This we learned to interpret as a futile attempt at cough. It was much like a smoker's clearing of the throat as mucus trails down to his larynx.

Her face was dirty, pale, the malar region flushed. Tongue was moist, the tonsils without exudate, muco-pus in pharynx, no discharge from the ears. There was little or no fever and only a few moist râles in the chest.

The nostrils flared, there was dyspnea, exaggerated, violent costal respiration. The abdomen was empty, the anterior wall lying on the posterior wall. The scaphoid abdomen would have held a little water, and, furthermore, the water would not have

been spilled in respiration. There was no descent of the diaphragm and no heaping up of the abdominal contents. On the other hand, on inspiration, *the liver and epigastric contents slid up under the ribs*, were aspirated upwards, carrying the diaphragm with them.

During the first four days and nights in the hospital, the prognosis was grave. The patient could with difficulty be fed. At night, when asleep, the breathing frequently became halting and ceased. A nurse was obliged to be at her bedside all the time. Several times each night the nurse compressed the chest and performed artificial respiration. The child begged to be left undisturbed, "If you'll only let me alone," she said.

The evidences of palatal paralysis were: Difficulty in swallowing, inability to lift the palate (velum) when touched with a probe, inability to pronounce such words as "Rosie," her name. During convalescence she had difficulty, more than all, in saying, "tooth." The latter was such a dismal failure and evoked so much amusement, that the child cried and would not try before company. The whole ward was entertained.

The evidences of paralysis of the diaphragm were: Exaggerated costal movement, moving upward, during inspiration of the liver and epigastric contents, inability to produce explosive cough.

The reader may simulate the sound of her peculiar cough by suddenly contracting the abdominal walls leaving the diaphragm, palate and larynx lax.

There was slight internal strabismus.

Urine was normal; no albumin.

There were never any evidences of diphtheria, but it is supposed she had an undiscovered mild diphtheria, which untreated, ran its full course and resulted in toxic neuritis, with consequent paralysis, ocular, palatal and diaphragmatic.

As to the subsequent course, there never was any fever, or albuminuria, the diaphragm began to show a little action on the fourth day, and in ten to fourteen days was in full function.

The soft palate gradually improved, but was not in full function for a month.

Finally the girl left the hospital quite well. "Rosie" and "tooth" remained her test words to the last, and only at the end of a month was she able to acquit herself favorably on these.

II. PARALYSIS OF COSTAL RESPIRATORY MUSCLES: ACUTE HEMORRHAGIC MYELITIS; DEATH IN THREE DAYS.

DYSPNEA—RESPIRATION WHOLLY DIAPHRAGMATIC.

The patient was a twin girl, three and one-half years old, living in Stamford, Conn., tended by Drs. Rogers and Samuel Pierson.

For one week the girl had an ordinary cold, with some bronchitis, and was in bed the early part of that time.

Dr. Rogers considered her, after four days, nearly well, and discontinued his visits. While quietly playing at her father's knee the child suddenly fell to the floor, and was unable to rise. No pain.

On being lifted up, her legs were powerless, "hung down," as the father observed, "like two empty stockings." She was put into bed, vomited and continued to do so many times. An hour after attack pulse was 120°, respiration 30°, temperature 104°.

About twelve hours after first attack, Dr. Pierson saw her in consultation. Temperature then was 105° F., pulse 140°, regular and full, respiration 40°. Sensation absolutely abolished below the waist. Vomiting severe, prolonged and frequent. Lungs negative, neck somewhat resistant.

Twelve hours later, or twenty-four hours from the attack, I saw the case, with the two gentlemen mentioned. At this time the temperature had fallen to 100° plus. Vomiting was less, but her other symptoms were more marked. Respiration was labored and abdominal. Her appearance suggested shock. She was very pale, relaxed, her face mask-like, eyes half closed. Dyspnea marked. Her abdomen was distended and heaving violently; her thorax did not expand at all. Nostrils flared.

There was slight stiffness of neck, but no other evidences of meningitis. No paralysis of face or tongue. Spleen not feelable. There was paralysis of the muscles of the thorax and paraplegia—*i. e.*, absolute loss of motion and sensation in lower limbs, loss of patellar reflexes, retention of urine, incontinence of feces.

The ability to phonate was present till death. Pulse continued regular, respirations were always regular, becoming more and more shallow. Patient became very restless, tossing head from side to side, and died suddenly, forty-five and one-half hours after the first attack.

DYSPNEA: The nostrils flared, the thorax was still, the abdomen heaved. The respirations were labored, wholly abdominal,

regular. The abdomen being distended, made its heaving more marked and a most striking phenomenon to witness.

Another observation, and never explained, was this: no air entered the left lung anteriorly. There was no dullness—simply no sound of air entering. On the other hand, air entered the other lung violently, making an exaggerated sound. There were a few râles posteriorly, and a declining temperature, no evidence of consolidation or fluid. Heart in normal position. Digestion good.

Our diagnosis has been submitted to expert neurologists and stands corroborated as follows:

Acute infectious transverse myelitis, the lesion affecting the dorsal and lumbar portions. The infection possibly influenza. The month was March and influenza was said to prevail in the vicinity.

The whole course of the disease was so rapid that no blood studies could be carried out, and there was no autopsy.

III. DYSPNEA: OBSTRUCTIVE AND NOT NASOPHARYNGEAL, NOR LARYNGEAL, BUT DUE TO ACCIDENTAL PRESENCE OF AIR IN THE PLEURA, PROBABLY DUE TO FAULTY METHODS OF NEEDLE EXPLORATION IN A TUBERCULOUS LUNG.

While witnessing an operation in the amphitheatre of the Presbyterian Hospital, I was asked to examine a young child just brought in for empyema, and if I considered it an operative case, to send it to the table at once.

I found a child of two years sitting upon the bed, laboring for breath. It was pale, anxious, wholly absorbed in the business in hand, namely, getting sufficient air. Its mouth was dry and it was trying to moisten its lips with a dry tongue. It was panting, grunting, preoccupied. It seemed rather an imposition to examine it and worry it.

The heart was much displaced to the left and downwards. Its right chest was dull, front and back, near the median line up and down. There was over this area diminished breathing, moderate dullness, bronchial voice and breathing indistinct and distinct. However, in the lateral half of the chest, a large lenticular displacement by air was observable. This centred in the axillary line and about a needle prick seen in the skin.

From this needle site the father reported that the doctor had aspirated pus and had consequently sent the case to the hospital for operation. It was obvious that the child would not live long unless

relieved. Air was surely present and crowding the heart over and down. Pus was probably present. The child was anesthetized lightly, the chest opened and air escaped freely, but no pus. Everywhere were adhesions and consolidated lung, but no pus.

The operation was short, the heart returned partly to place, and the case was returned to the ward to linger, as it was believed, a little while and probably die. We felt that there must be an abscess either mediastinal, between the lobes or near the root, or that there must be mediastinal tuberculous masses. Dr. McCosh, the operator, could find neither abscess nor masses. The condition of the child warranted but the briefest operation.

At present writing the case is still in the hospital, running a low temperature and comfortable. The diagnosis now is tuberculous consolidation, with probably cheesy masses about the roots and within the anterior mediastium.

It is unusual, in my experience, to have any kind of a mishap from exploration by needle. In the present case we have no knowledge of the manner of using the needle and what led to the accumulation of air. From my experience and observation I should say, no accident can happen, barring adding another infection. Moderate cleanliness will avert that.

Finally, the dyspnea which constituted the most prominent and the most urgent symptoms was due to the air in the pleura, crowding and embarrassing lungs and heart. Releasing this air caused instant relief and lasting freedom from dyspnea.

This I have called an obstructive dyspnea.

P. S.—Three and one-half weeks later the child died, and partial autopsy throws this light upon the case. At the time of operation there was a deep tuberculous softening, perhaps abscess, at the root of the lung. The needle possibly reached this and allowed air to escape into pleura. At the time of autopsy the whole central portion of the lung was excavated and drained through operation wound and bronchi. The lung resembled the cavity of a cocoanut, with thin wall all about originally adherent, everywhere.

DISCUSSION.

DR. HOLT.—All of Dr. Northrup's cases are very interesting. His first case I have seen paralleled where the symptoms came on late in diphtheria and where no treatment, or late antitoxin, had been given. I have never seen anything exactly like the third case.

DR. CRANDALL.—Dr. Northrup's third case is interesting and I have seen a case that perhaps explains it. I was called to aid a physician who by mistake had reversed his aspiration pump and injected air into the pleural cavity. The patient was in an extreme condition of dyspnea and cyanosis, but was relieved by aspiration.

DR. ABT.—Greater care should be exercised in making aspirations. I believe that in unskilled hands harm can be done. The needle used is often unnecessarily long and is introduced at too great depth. I have frequently watched hospital internes aspirate the chest, who used a needle $3\frac{1}{2}$ or 4 inches long, and plunged it deeply into the thorax. If a long needle is used, it should be guarded by winding sterile cotton about it so that not more than 1 or $1\frac{1}{2}$ inches of the needle penetrates the thorax. It is preferable to use a short needle, which should be of somewhat wider calibre than those ordinarily used. If all the cases of accidents from hemorrhage, infections, broken needles, etc., were at hand, a large list would be furnished. I recall seeing 1 case in which peritonitis developed, the infection being carried from the pleural cavity into the peritoneum along the track of the needle.

DR. CAILLÉ.—I have seen pneumothorax from puncture on two occasions and it was an unfortunate accident. I reported to the Society a series of such cases years ago. It happens when the point of the needle enters the lung and too many lateral excursions are made with the needle.

DR. NORTHROP.—I believe I have seen about everything that can happen from the use of the needle, but I have never seen any serious harm done.

Scarlatiniform Erythema. — Olimpio Cozzolino (*Riv. di Clinica Pediatrica*, February, 1903) reports 2 cases of an eruption from which he draws the following conclusions: (1) That there is a form of desquamating, relapsing scarlatiniform erythema independent of infective disease or of intoxication by drugs or serum therapy, which in nowise differs from scarlatina except possibly in the manner of its distribution on the face, the long duration of the eruption and the early appearance and amount of desquamation, so that a first attack may puzzle the most experienced practitioner. (2) A second and third attack exclude all possibility of doubt. (3) The disease should be considered a general toxic infection, a toxi-derma due to toxidermic agents circulating in the blood which may be chemical or bacterial. (4) The disease may recur from probable autointoxication of gastrointestinal origin. (5) The prognosis is usually favorable unless there should arise grave complications such as pericarditis. (6) The majority of cases reported as relapses of scarlatina should be considered as scarlatiniform erythema.—*American Journal of Obstetrics.*

UMBILICAL CORD HERNIA.*

BY J. P. CROZER GRIFFITH, M.D.,

Philadelphia.

Hernia at the umbilicus in early infancy may be of two forms.

(1) First the acquired, in which a portion of the intestine projects through the rectus muscle, and pushes before it a layer of peritoneum and the tissues of the skin. This variety is so well-known, and of so frequent occurrence that no further description is required.

(2) The second form is that known as congenital hernia, or hernia into the umbilical cord (*hernia funiculi umbilicalis*). This is sufficiently unusual to justify me in exhibiting to you the specimen before you. It occurred in the practice of Dr. Weiszgerber, and was kindly given me by him. It is a fetus, which was born at full term, and is, as you see, a monster. The vault of the cranium is entirely absent, and the brain is exposed. The matter to which I wish to call especial attention is the condition of the navel itself. When this specimen was fresh there was situated here a translucent tumor, which was about the size of a quite small apple, and contained some loops of intestine. At the base of the tumor, and surrounding it, was a narrow circular area composed of tissue resembling in appearance that of the mass itself; *i.e.*, a translucent membrane, in which there was evidently no trace of muscle or true skin.

Without entering at all upon the details of the literature of the subject, hernia into the umbilical cord consists of the projection of a portion of the intestine, or even more of the abdominal organs through an opening at the navel. This opening is the result of arrest of development of the abdominal walls, but the original cause of this failure of development is uncertain, and various theories have been entertained.† The hernia forms a tumor varying in

* Read before the Philadelphia Pediatric Society, January 10, 1905.

† A statement of the various theories, together with a useful bibliography, may be found in a careful article by Dr. Wollstein in the ARCHIVES OF PEDIATRICS for June, 1904.

size from that of a nut up to that even of a newborn infant's head, or larger. It is oval, round or barrel-shaped, with the cord starting from the distal portion. The hernial sac appears to be composed of the distended umbilical cord. Its walls consist of peritoneum and of the amnion of the cord alone, and are grayish white and translucent. The contents are usually coils of intestine, but sometimes all, or a part, of the liver, the stomach, the spleen, or other organs may be found in it. The color of these is distinguishable through the walls of the sac. The size and tension of the mass increase with crying or coughing. The hernia can sometimes be reduced, and sometimes not. When it is of small size, recovery may take place spontaneously with the removal of the cord. A reactive inflammation then sets in around the ring-shaped border of the hernia. The color of the hernial sac changes, the umbilical cord shrinks, and, finally, it and the amnion separate. Granulations then spread gradually over the surface remaining; generally with free suppuration. As the wound thus left heals and shrinks, the hernia disappears within the abdominal cavity. A cicatrix remains, but no real navel.

Many dangers, however, attend this process, and a fatal issue generally results. The peritoneum is very liable to invasion, the hernia becomes gangrenous, or general sepsis develops. The prognosis is, on the whole, grave. By far the larger proportion of cases died until the radical operation was introduced and perfected. Even thus the mortality is large.

In case of very large hernias with the presence in the sac of a considerable portion of the abdominal contents the subject is scarcely able to live. Sometimes the sac breaks during birth, leaving the child partly eviscerated. Very often the infant exhibits other malformations, some of which are incompatible with life, as in the case exhibited this evening. Not infrequently the infants are premature or stillborn.

The diagnosis is easy, except in the case of small cylindrical hernias into the cord. Here it is easy to overlook the condition, and to apply a ligature, which, of course, ligates the intestine as well. Every child, born with that portion of the cord which is next to the body decidedly swollen, should be examined very carefully before a ligature is applied.

The treatment consists, first of all, in the greatest care in handling a congenital hernia, and in the use of every possible antiseptic precaution. If the hernia is small, and if reduction can be made

quite easily, this may be done, and an antiseptic compress applied and held in place with adhesive plaster. The child must not be lifted into an upright position until the wound has completely cicatrized, and this may not be for weeks.

If the hernia is not reducible, it may be covered with an antiseptic protective dressing, in the hope that granulations may form, and the process go on as just described. A much more successful plan of treatment, however, applicable, also, to the small reducible hernias, is the doing of a radical operation as soon after birth as possible, and without any previous effort at reduction being made. The operation may be done either without the opening of the peritoneum or with it. After the operation the temperature of the child should be maintained, preferably in an incubator. Many infants have been saved by the operative procedure.

Local Use of Quinin in Hay-Fever.—A method of using quinin or euquinin locally in typical cases of hay-fever has proved remarkably successful in the hands of Dr. Henry D. Fulton, of Pittsburg, Pa. The treatment consists of the employment of a saturated solution of quinin sulphate, in sterilized water, as a nasal spray, and the application to the mucous membrane of the nares of an ointment consisting of quinin and vaselin, in the proportion of 30 grains to the ounce, the applications being made every four or six hours. After trying various unguents and combinations, simple vaselin has been found to be the best base.

The use of the spray alone will not suffice, but should be used as an adjunct to the ointment. Spraying the nares will at once stop all symptoms of coryza, but the effect will soon disappear unless followed by the thorough application of the ointment. The application of the ointment should be made at least every six hours, and it may be necessary to repeat it every four hours. An application at bedtime, and at two or three o'clock in the morning, will prevent all symptoms through the night. Two or three applications of the spray should be made in the twenty-four hours, at the times when the patient has found the irritation to be at the maximum degree of intensity.

The little finger is the most convenient applicator. In most persons the slightly bitter taste in the throat from the quinin is not objectionable, but where this proves to be a drawback to its use, euquinin (quinin carbonic ether), which is wholly devoid of any unpleasant taste, can be substituted, and will be found equally efficacious, says the author.—*Journal American Medical Association.*

CHRONIC INTERSTITIAL NEPHRITIS AND ALKALINITY OF URINE TWO COMMON CAUSES OF INCONTINENCE OF URINE IN CHILDREN.

BY J. R. CLEMENS, M.D.,

Chief of Clinic of St. John's Hospital and of the Rebekah Hospital, Children's Departments, St. Louis, Mo.

With an abundant clinical material at command and a mind frankly prejudiced against the symptomatic belladonna treatment of the so-called nervous incontinence, I have made within the past year observations regarding the etiology of the condition that tend more and more to accentuate the unwisdom of treating the symptom rather than its underlying cause. In my experience the four commonest causes of incontinence were, in order of frequency:

(1) Hyperacidity of urine. (A condition persisting by day and night.)

(2) Adenoids. (Nocturnal incontinence—true enuresis.)

(3) Chronic interstitial nephritis. (Nocturnal and diurnal incontinence.)

(4) Alkalinity of urine. (Due to fixed alkalies—incontinence by day and night.)

I know there are many clinicians who deny the fact that chronic interstitial nephritis is of common occurrence amongst little children, but I would ask what other diagnosis can be made in the following case:

A child (four to eight) is brought by the mother to be treated for bed-wetting and incontinence by day. The past history of the child is more often positive than negative as regards scarlet fever. In appearance the child is pale and languid, with some emaciation.

There is generally a history of frequently recurring attacks of sick headache; the child's face, when it wakes in the morning, is swollen ("bloated"), and toward night the child often complains that its shoes pinch. Examination of the urine shows a trace of albumin, the specific gravity is very low, and under the microscope

some casts are found. Examination of the cardiovascular system is significant.

The heart is hypertrophied, the apex beat outside of the nipple line, and the aortic second sound accentuated, which, in little children, is pathognomonic. The pulse is wiry. Ophthalmoscopic examination negative.

We have, then, a child with the following syndrome-complex:

Polyuria (low specific gravity; albumin casts). Uremic symptoms (occasional sick headache). Wasting, hypertrophied heart, hard pulse, accentuation of the aortic second sound. The only diagnosis to my mind possible is that of chronic interstitial nephritis. Such a history in children is, in my experience, far from infrequent.

The postmortem condition of the kidney in children dead of scarlet fever, or its sequels, is either that of acute nephritis, or of chronic parenchymatous nephritis; but not all children with scarlet fever die, and, therefore, the later conditions of the kidneys of the survivors are to be gauged by clinical examination only. The dictum in textbooks that children do not suffer from chronic interstitial nephritis is based on postmortem findings of the victims of scarlet fever and not on clinical statistics of the survivors.

Another condition causing incontinence of urine I wish to direct attention to, is that of alkaline urine. The alkalinity is independent of the alkaline tide and is due to some fixed alkali, *e. g.*, carbonates. There is never any signs of cystitis. The urine is sterile. The only treatment of this condition that is successful is by acid sodium phosphate. It is a drug difficult to obtain.

In some 148 cases in the past year I have never had an occasion to use belladonna, and have been successful in all, except those due to organic disease such as nephritis, and in some cases of hyperacidity, or of alkalinity, where the pendulum of urinary reaction in primary cases of hyperacidity had swung too far over to the alkaline side, the converse obtaining in those primary cases of alkalinity. The great difficulty lies in bringing about just sufficient neutralization and keeping it constant. These are the cases that prove so disappointing.

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SURGICAL TREATMENT OF CHRONIC FACIAL PALSY.

Nerve anastomosis is an important recent development in the surgery of the peripheral nerves. During the past decade the experimental work of Faure, Manasse, Barrago-Ciarella and Breavoine on the Continent, and Kennedy, Ballance and Stewart in England has demonstrated some new and important facts in this field of work. A few clinical cases of peripheral nerve repair in paralysis have been reported from time to time during the past few years. The most signal impetus to this work was given by Kennedy, who reported a few years ago a successful case of facial spinal accessory anastomosis in the treatment of facial tic. He

followed this clinical work by experiments upon dogs to clear up the points in the physiological process of restoration. Kennedy not only showed that when the peripheral end of a divided motor nerve is sutured to the proximal end of a neighboring motor nerve, the paralyzed muscles ultimately regain their coordinated function, although somewhat less completely than normal, but he also found that the proximal stump of a nerve which supplied a flexor group of muscles could be joined with the peripheral end of one supplying extensor muscles and after a temporary disturbance of function complete restoration of motion followed. Electrical stimulation of the cortical centers representing these several groups of muscles demonstrated that through a process of education the centres had become reversed.

While experimental work of this sort on animals cannot be applied to the human subject without reservation, Kennedy's work has received signal corroboration in the operations which have recently been done for the cure of chronic facial palsy. It has been found in some 20 or 30 cases of this type of paralysis, that after the distal stump of the facial is engrafted into the proximal stump of a healthy nerve there is more or less complete restoration of function in the distribution of the facial nerve. The nerve employed for anastomosis with the facial was formerly the spinal accessory, and more recently the hypoglossal. The latter seems now to have decided preference on anatomical and physiological principles. Frazier (*University of Pennsylvania Medical Bulletin*, November, 1903) of Philadelphia, reported 1 case and Taylor and Clark (*Medical Record*, February 27, 1904) 4. The irrevocable paralysis in the distribution of the hypoglossal is the great objection to Frazier's end-to-end suture of the two nerves. Taylor and Clark have fairly overcome this difficulty by a lateral implantation of the facial into the hypoglossal nerve. While an end-to-end suture would undoubtedly give the very best functional results in facial repair, the final results in 4 cases shown by Taylor and Clark at the New York Academy of Medicine, February 3, 1905, prove that lateral implantation is highly satis-

factory. Even the relatively slight damage to the use of the tongue reported in the first 2 cases, which was caused by manipulation of the hypoglossal nerve, has nearly disappeared, and this complication was very slight in the last one operated upon.

Taylor and Clark meet the objection that the hypoglossal nerve is not able to perform the double function of its own and that of the facial on anatomic grounds. They cite the well-known superior size and functional ability of the twelfth nucleus. On the whole the gratifying results of this form of surgical treatment of facial palsy bids fair to soon take equal rank with other established methods of surgery of the peripheral nerves. Surgeons who have the opportunity to operate in this class of cases should record them so that more extended information regarding the character and extent of the paralysis as well as the details of operative procedure may be available.

Arsenic in Chorea. — Shaikevitch (*Russki Vrach.*, September 20, 1903) has used arsenic in large doses in 5 cases of chorea, according to the recommendations of Comby and of Filatoff. He finds that children bear large doses of this remedy without any unpleasant consequences. Comby has used a solution of one part of arsenic in 1,000 parts of water, which he diluted six times with water before using, and of which he gave teaspoonful doses to older children about ten years old, while younger children received half a teaspoonful. The maximum daily dose is, according to Filatoff, three and one-half teaspoonfuls to seven teaspoonfuls daily. The present author did not see any cases of arsenical poisoning among these children, and no arsenical paralyses were observed, such as occurred in Comby's practice. In two cases there were transient diarrhea and vomiting, respectively. While the results obtained by Comby and by Filatoff were very good, the present author did not obtain satisfactory results with this form of treatment. The usefulness of this method of treatment has not been demonstrated, and there is really no reason for giving arsenic in chorea, while this substance may do a great deal of harm in children in such large doses.—*New York and Philadelphia Medical Journal.*

Bibliography.

The Theory and Practice of Infant Feeding, with Notes on Development. By Henry Dwight Chapin, A.M., M.D., Professor of Diseases of Children at the New York Post-Graduate Medical School and Hospital, etc. Second Edition, Revised. Illustrated. Pp. xi.-342. New York: William Wood & Co., 1904. Price, \$2.25.

When the author of this volume presented the first edition of *Infant Feeding* to the medical profession, there was a question in the minds of many as to how far a study of the biology of cow's milk would influence practitioners in the preparation of modifications of it for daily use. There was even at that time, now only a little more than two years ago, a growing appreciation of the fact that something more than a knowledge of chemistry was needed in adapting the food of calves to infants. Dr. Chapin's book was a protest, not against laboratory methods, but against a misunderstanding of their value, as cow's milk however modified is never human milk. No other writer had expressed himself on the importance of biology in connection with substitute feeding.

The second edition of Dr. Chapin's book has been enlarged by the addition of thirty pages of new matter. A study of the proteids of different milks is presented to show that there is a decided physiological value in each milk that is essentially part of the function of development and entirely outside of the nutritive quality of the milk. The author sustains this point by the experiments made in the agricultural stations of the States where particular attention has been given to the feeding and care of cattle.

Assays of cow's milk made over a period of four years show a remarkable uniformity of fat and proteids. For example, the highest fat percentage is 5.89 and the lowest 5.00, an average in 47 analyses of 5.23. The proteids are even closer, the highest being 4.92 and the lowest 4.64. This milk is a high grade Jersey milk. In making modifications of cow's milk Dr. Chapin believes that absolute percentages are not essential.

There are many suggestions for infant feeding, and the digestion of cereal decoctions is studied in the relation of these diluents to the assimilation of proteids.

The volume is full of practical suggestions, and with a knowledge of the biological side of the subject the practitioner who reads the book will gain an insight into methods of infant feeding that have seemed heretofore like studies in algebraic formulæ.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, January 12, 1905.

L. E. LA FÉTRA, M.D., CHAIRMAN.

A CASE OF EMPYEMA APPARENTLY CURED WITHOUT OPERATION.

DR. L. E. LA FÉTRA presented a boy seen at the Vanderbilt Clinic in November, 1904. The family history was negative as regarded tuberculosis. Two months previously the boy had had an illness said to have been "typhoid pneumonia." About the middle of October he again began to cough, the cough being more marked in the morning. He lost his appetite, became weak and had some pain in the abdomen on exertion. He had been having fever in the afternoon and night sweats. Physical examination showed flatness from the base of the right chest up to about the angle of the scapula and Skodaic resonance above and in front; the heart was displaced to the left about one inch. Upon puncture below the scapula half a syringe full of pus was withdrawn. Three days after the child had first been seen he was taken to the operating room of the Roosevelt Hospital and four or five punctures made by the House Surgeon failed to reveal the presence of pus. A similar search was made the following day and again no pus was found. A few days later persistent and determined efforts were made by others as well as by Dr. La Fétra to find pus, but none could be found. By the end of November the child had greatly improved, the heart was in its normal position and the voice sounds had increased so as to be quite perceptible; dullness had markedly diminished. On December 6th the râles were fewer, the breathing could be feebly heard over the area of dullness. By December 20th the boy was very much improved; the breathing sounds were nearly normal and there was only a slight dullness. The child had never coughed up mucus and, therefore, there could have been no discharge from the bronchi.

DR. HENRY KOPLIK said that he had never succeeded in curing a case of empyema by aspiration without subsequent operation. He had lately run across half a dozen cases of empyema

in which he could not operate immediately and he had plenty of opportunity to test the aspiration method. One boy had been tapped six times. This patient ran a very high temperature and no operation was contemplated because it was believed a pneumonia still persisted. Subsequently the boy was brought to operation by incision and made a good recovery. In this case he did not dare to take out a rib. In the case presented by Dr. La Fétra he said there were two possibilities: first, that all the pus had been removed by aspiration and then the boy, by his own natural powers of resistance, was able to dispose of any remaining pus himself; secondly, that the effusion left had become inspissated, the bacteria less virulent, and simply a thickened pleura had been left behind. If this was a true case of empyema he doubted whether simple aspiration would cure the case. Dr. Koplik had seen many cases in hospital where the physicians had found pus before admission; but after admission pus could not be found; then after two or three months pus would be found and operation performed. If he was positive the physician had found pus and yet he (Dr. Koplik) failed to find it, he kept such patient under close observation, and once a week or oftener percussed the chest; if flatness was at any time found he then felt warranted in making further exploration. Fortunately the pus sometimes came to the surface.

DR. HENRY DWIGHT CHAPIN asked Dr. Koplik if, in such cases, he found protracted temperature.

DR. KOPLIK replied that the temperatures might remain low for weeks and then suddenly jump two or three degrees.

DR. CHAPIN said he wished to refer to a case which occurred in the hospital. The patient was a child of two years who had a pneumonia which apparently resolved, the temperature remaining normal for ten days or two weeks. At that time a member of the house staff introduced a needle and found pus. Dr. Chapin's general belief was that such cases usually ran a hectic temperature.

DR. JOSEPH E. WINTERS referred to a case that he presented before his class some years ago in which he made the diagnosis of empyema. Under the influence of an anesthetic a needle was introduced at six different points with negative results. The patient remained under observation at the DeMilt Dispensary for many months and then the pus was found to have burrowed

through the right crus of the diaphragm and appeared well down in the lumbar region and was opened as a superficial abscess by an assistant; the patient made a good recovery. He also recalled a case seen at the Columbus Hospital in which a diagnosis of empyema had been made. The child was placed on the table and an incision made, but no pus found. This patient was in the hospital some weeks, went home, soon afterwards entered the New York Hospital and was operated upon successfully there. In the child presented by Dr. La Fétra he believed pus was still present and advised that he be watched for months before a positive opinion as to cure be given.

DR. MATTHIAS NICOLL, JR., referring to Dr. Koplik's statement about not operating upon cases of empyema, if an unresolved pneumonia was present, said that he had done a great many autopsies upon those cases and had found that in at least 50 per cent. of the cases there was a sufficient amount of turbid fluid in the pleural cavity to very much embarrass respiration and which would have been relieved by operation. Personally he could not see any advantage in making it a rule *not* to operate and relieve this mechanical embarrassment, even though the child's lung was solid.

DR. LA FÉTRA said that since the first of November the boy had been continuously under observation and that the auscultatory signs had markedly lessened and the child had greatly improved. The breathing and voice sounds had improved, the temperature was normal, and the child appeared very much better and had gained in weight. This was the reason he had announced on the folder that the child was "apparently" cured. Two years ago, he said, he had seen a similar case and the child had been operated upon and only an edematous pleura found. Whatever pus was present had become inspissated and absorbed and that was all. Notwithstanding these two experiences, he believed that in every case of empyema it was the duty of the attending physician to operate, because the chances of recovery were small without operation.

STANDARDIZED GRUELS: AN APPLICATION OF THE PERCENTAGE PRINCIPLE TO GRUEL FEEDING.

DR. HENRY DWIGHT CHAPIN said that during many years gruels had been used empirically for their known beneficial effects as a diluent of cow's milk for infant feeding. It was now recog-

nized that they have other values than those of attenuants of the curd of cow's milk. They may often be employed to economize the energy of the body that is being used in the effort to prepare food for assimilation. By taking advantage of this fact it is often possible to keep the body well nourished on a quantity of food much smaller than is theoretically indicated. There should be some uniform standards for use in preparing gruels and their food values and possibilities should become better known. For the purpose of establishing standards the writer had a number of different kinds of gruels made and then had them assayed. Pearl Barley, Prepared Barley Flour, Wheat Flour and Rolled or Flaked Oats were used. The Pearl Barley was boiled for three hours, while the Rolled Oats, Barley and Wheat Flours were boiled for one hour. The flours all passed through the strainer, but a portion of the Pearl Barley and Rolled Oats remained on the strainer. The analyses were made at the New York Agricultural Experiment Station by the director, W. H. Jordan, with the following results:—

PLAIN GRUELS.

		Total Solids.	Proteids.
1 oz. Av. Pearl Barley	to quart (32 ozs.)	1.483%	0.140%
1 oz. Av. Prepared Flour	" " " "	2.288%	0.195%
1 oz. Av. Wheat Flour	" " " "	2.494%	0.331%
1 oz. Av. Rolled Oats	" " " "	1.931%	0.262%

The composition of gruels made with 6 ounces of cereal to the quart gave almost exactly six times the composition of the gruels made with 1 ounce to the quart. If a definite weight of cereal was used, and none was removed by straining, the composition of any gruel could be calculated by dividing the composition of the cereal by the number of times it was diluted. This rule could not be followed in cereals which were not completely broken up and a part of which was removed by straining. After careful experiment the author said that it could be safely accepted that one level tablespoonful of Pearl Barley weighed $\frac{1}{2}$ ounce; of Barley Flour, Wheat Flour and Rolled Oats $\frac{1}{4}$ ounce, avoirdupois. Of course a table for the making of gruels would not always be absolutely accurate, because the composition of cereals was not always uniform and the concentration of the gruels would slightly influence the specific gravity; but a table constructed from these data would be as accurate as those used in modifying cow's milk.

APPROXIMATE PERCENTAGE COMPOSITION OF GRUELS.

	Pearl Barley.		Barley Flour.		Wheat Flour.		Rolled Oats.	
	Pro- teids.	Carbo- hy- drates.	Pro- teids.	Carbo- hy- drates.	Pro- teids.	Carbo- hy- drates.	Pro- teids.	Carbo- hy- drates.
1 ounce to quart.....	0.14	1.34	0.195	2.093	0.331	2.161	0.262	1.669
2 ounces " ".....	0.28	2.68	0.390	4.186	0.662	4.322	0.524	3.338
3 " " ".....			0.585	6.279	0.993	6.483	0.786	5.007
4 " " ".....			0.780	8.372	1.324	8.644	1.048	6.676
5 " " ".....			0.975	10.465	1.655	10.805	1.310	8.345
6 " " ".....			1.170	10.558	1.986	12.966	1.572	10.014
7 " " ".....			1.365	14.651	2.317	15.127	1.894	11.683
8 " " ".....			1.560	16.744	2.648	17.288	2.096	13.352

Plain gruels cannot be made much stronger than two ounces to the quart.

Dextrinized gruels may be made up to as high as eight ounces to the quart.

The above table was shown, giving the approximate percentage composition of gruels as regards proteids and carbohydrates. The fat and mineral matter present in the gruels was so small in quantity as not to warrant consideration. Plain gruels could not be made much stronger than 2 ounces to the quart. Dextrinized gruels might be made up as high as 8 ounces to the quart. The high proteid gruels were of great value in many diverse conditions. The author had employed them in persistent vomiting in patients of all ages. There was a widespread erroneous belief that vegetable proteids were not good tissue builders and were not readily digested. Recent studies have shown that as high as 98 per cent. of the proteid of white bread is digested by men. The proteid of oatmeal is as thoroughly digested as meat if it has been separated from the fibre. Cereals in the form of well-cooked gruels have the cellulose ruptured and so expose the proteids that they may be readily acted upon by the digestive enzymes.

DR. JOSEPH E. WINTERS, after asking Dr. Chapin if he intended to state that these cereals were to be used in young infants and getting an affirmative answer, said that cereals could take the place of milk but only after a certain period of life, after the first year; but that up to that period the use of cereals was not only useless but injurious. Ample proof of this was to be seen every summer. He believed that any man living in this twentieth century who told him that he could subvert and supersede physiology and the laws of physiology should be at once referred to the highest code for judgment, namely, the baby. Those babies that are fed on cereal gruels during the summer become ill and absolutely fail. He said he had never seen an infant fed on cereal gruels up to the age of six months but suffered very much

and was absolutely starving to death. As could be confirmed babies from the age of one month up to the age of six months suffered from the gravest malnutrition when fed on cereal gruels, and they made a rapid recovery when changed to the milk diet. The work done, recently, by Dr. Shaw, of Albany, he said, showed conclusively that infants could not digest cereals. He referred to a case seen last summer of a baby, three and a half months old, who was suffering from intestinal trouble and who had been fed on cereal gruels for two weeks, suffering from extreme malnutrition in consequence. The soiled napkin revealed the fact that the cereal gruel was passing through the intestinal tract without being at all digested. If the feeding had been much longer continued the child would have died of inanition. Dr. Winters believed that the enormous death rate among children was chiefly due to the use of these cereals. He acknowledged that there was a use for these cereal gruels, but not before the age of six months and in summer not before the seventh or eighth month, and, if the child had diarrhea, not under the age of one year. On the other hand, after the age of one year he believed that the cereals should be the almost exclusive diet of the child. In children one year old or over the gruels should take the place of the broths now so extensively used. Dr. Winters closed his part of the discussion by stating that any medical man who advocated the use of cereal gruels in infants under six months of age, in health or in disease, should be sent back to the medical school and study physiology.

DR. HENRY KOPLIK said he could not understand how it was that one man with a large experience would say one thing, and another man, with an equally large experience, would absolutely nullify what the other had said; both could not see the same material, or else one man did not try certain methods with the same amount of scientific patience. In view of his own success with the cereal gruels he could not understand Dr. Winters' statement. Dr. Koplik tried always to feed the baby and whatever satisfied the baby satisfied him, and it was always his endeavor to find out what the baby needed. He fed the babies from birth on cereal gruels and milk, and they thrived beautifully in most cases. If one fed certain babies on milk or on some malt preparation and milk, they may not gain in weight until some cereal gruel was added. In the atrophic conditions of children the greatest benefit is to be derived from this kind of feeding, as shown not by one

but by fifty or a hundred cases in his history books. They are to-day not rachitic babies but babies of good color and of good weight. Wheat flour was one of the most important foods we now have. There are many ways of feeding babies successfully and to depreciate the work done by Dr. Chapin was a great pity. Dr. Koplik said he had actually fed twins on wheat flour gruel and milk from birth, when they could not digest cow's milk or cow's milk and barley-water; he fed these babies until they now were one year old, and they were beautiful children. Dr. Koplik said that his experience in adding cereal gruels to milk was large. He wished to reiterate the statement that babies would thrive from an early age of infancy on milk modified with gruels, when they would not thrive on some modification of milk with water.

DR. THOMAS S. SOUTHWORTH said there were two kinds of work which was of value in unravelling the problems of infant feeding, one the purely scientific inquiry into fundamental principles, such as contributions to the science of infant feeding and, secondly, the practical application of these principles to everyday work, contributions to the art of infant feeding. In both of these he said that Dr. Chapin had made notable contributions during the past few years. He called attention to the fact that every man who contributed something new was almost always subjected to criticism, and it was well that it was so. Dr. Chapin did not claim that he originated this method of feeding; Dr. A. Jacobi did that years ago and many others before Dr. Chapin had used this method. Like most things in infant feeding the difficulty had been that we failed to have a clear idea of the exact purpose which the food was to subserve; we had now certainly passed the time when we believed that by any modification of cow's milk that we could manufacture any counterpart of the breast milk. He said that Dr. Chapin did not recommend cereals alone in the daily feeding of children. The use of cereals had an immense field elsewhere, especially in those cases where milk must be omitted for a time. One should not be expected to nourish a child for a considerable period of time with cereals as the sole food. Cereal gruels were good things to change to when there must be a radical change in the infant's feeding. This food was *par excellence* as a food in the summer diarrheas of children. He said it had been stated that children or young infants could not digest the cereals; by the use of methods for dextrinizing the gruels sugar was formed and none would deny that sugar could not be absorbed by

young children. By the use of these cereal gruels in some cases he said too much fermentation might be produced. He believed the time was ripe for some real and exact knowledge concerning the difficulties of infant feeding and so far what was known about this had been upon an empirical basis.

DR. J. FINLEY BELL said that, two years ago, he did some chemical work in the laboratory on gruels and he learned several facts that Dr. Chapin had failed to bring out in his paper. He said that foods might be divided into three classes: the alkaline, the neutral and the acid, and what Dr. Chapin had referred to would fall under the head of the acid foods; that is, the ash of those foods was not alkaline in reaction but sometimes acid. He had made some investigations regarding scorbutus, but had not arrived at any definite conclusions regarding its dietetics. Scurvy was some form of intoxication. Gruels when boiled for some time developed purin bodies which were inimical to infant feeding.

DR. JOSEPH E. WINTERS said that, when a baby was fed on milk with cereal gruels added and that baby thrived, one had no proof that the cereal gruels had anything to do with it. The point that he wished to make was that during the summers in this city and in the country cereal gruels were being used by ignorant mothers and even by trained nurses to the exclusion of other foods, until these babies got beyond any possibility of help from any kind of feeding. It had not been emphasized enough that cereal gruels must be used in combination with milk and should never be used exclusively. No child of three or six months old should ever be fed on cereal gruels alone, although at a later period in life they would thrive on them alone.

DR. ROWLAND G. FREEMAN said he was anxious to learn the amount of nutriment in dextrinized foods which corresponded with that of milk. He believed that most babies did better on simple modified milk; but when they could not digest this well then the gruels could be added and with advantage. Theoretically babies of early age could not digest starches, but this claim should be taken with a grain of salt. During these earlier months he believed digestion was aided by the use of these gruels.

DR. KOPLIK said that he had never heard of feeding a baby on cereal gruels without the addition of milk; he had never even thought of such a thing except in acute illness, when cereal gruel alone was given for short periods of time.

DR. CHAPIN, in closing the discussion, said that he had already

written on the biology of cow's milk and briefly reviewed some of the points thereon. He tried to show the essential and radical difference between cow's and human milk, calling attention to the fact that milk had two functions, one the nutritive and the other the functional, in developing the alimentary tract; the proteids were instrumental in performing the second function, namely, that of developing the digestive tract of animals in a way to take care of what would be their future food. When cow's milk was placed in a baby's stomach it was a foreign body and it was unphysiological. The addition of these cereal gruels should cause finer flocculent masses than anything else when added to milk, and made a nearer approach to what would result in mother's milk than the addition of anything else he knew of. He said that there was no known way of making cow's milk like woman's milk; it had never been accomplished and it never would be because of biological arguments. Substances, then, should be placed in cow's milk which would have a certain nutritive value. Regarding his results in infant feeding, he asked the members to look back over his histories and, also, to think of the "flour-ball" and water which was used so much by Dr. J. Lewis Smith, and others, with such apparent benefit. When one asserted that it was the milk and not the cereal that was of such great value he was wrong. The cases most difficult to feed were those found in the hospitals, and these very feeble babies were found to thrive well on these cereal gruels, as he could state positively after over fifteen years' experience. No one system of baby feeding is always successful.

Chorea of the Heart.—Galdi (*Il Policlin.*, November 21, 1903), after discussing and accepting the existence of true chorea of the heart, draws attention to certain signs which indicate this disease. There are, first and most important, a marked and spontaneous variability in the diameters of the heart as estimated by careful percussion and triangulation of the area of cardiac dullness. This variability is still more manifest under the influence of stimuli, whether general or local. The heart, like other parts of the system, and more particularly the psychical elements, becomes in chorea more infantile in type, and responds more readily to stimuli, whether internal or external. The other two important symptoms are arrhythmia and a murmur. As illustrating the changes in size which may occur, the author quotes the case of a girl of sixteen with left hemichorea and cardiac chorea, where the base line varied in the course of forty days' observation from 9.3 to 6.5 cm., the right ventricular line 9.6 to 6.2 cm., and the left ventricular line 9.7 to 6.9 cm.—*British Medical Journal*.

THE NEW YORK ACADEMY OF MEDICINE.—ORTHO-
PEDIC SECTION.

Friday, November 18, 1904, 8:30 P.M.

HOMER GIBNEY, M.D., CHAIRMAN.

CONGENITAL TORTICOLLIS.

DR. WHITMAN presented the patient, a boy ten years of age, showing the secondary effects of a very severe congenital torticollis in the irregularity of the skull, the eyes, nose and mouth. The contractions had been entirely overcome by a division of the shortened tissues and by force with subsequent fixation. There was in addition a small meningocele of the neck and two supernumerary ribs. On either side one could feel resistant projections which are short ribs running outward and forward and downward, apparently to the anterior extremities of the first true ribs. The x-ray picture confirming the diagnosis had been mislaid.

TREATMENT OF CONGENITAL DISLOCATION OF THE HIP.

DR. WHITMAN exhibited an x-ray illustrating one treatment that may be necessary for congenital dislocation of the hip. From 50 to 60 per cent. of the cases cannot be anatomically cured by the Lorenz operation or any of its modifications. Of this 50 or 60 per cent. a large proportion of the failures are due to an anterior twist of the upper extremity of the femur. In such cases the joint should be opened, and if on inspection it appears that the femur is so distorted that the head cannot be placed in the acetabulum without inward rotation of the limb, an osteotomy is indicated. The dislocation is first reduced and the limb is fixed in the necessary inward rotation for a certain number of weeks or months. When repair is complete a long drill is put through the trochanter and neck, and if desired into the acetabulum. An osteotomy is then performed at the lower third of the femur and the limb is rotated outward to the proper degree. The x-ray picture presented showed the drill in position and the point at which the bone was fractured. The limb being placed immediately in a close-fitting plaster spica bandage, in which the drill is imbedded, the part is held in position until repair is complete.

DR. MYERS said that, when Dr. Lorenz was here, he had just had one of those cases with very marked anterior rotation of the head, and to get it into the acetabulum the leg had to be inverted to fully 90°. Subsequently, they had performed subtrochanteric osteotomy in the upper part.

In speaking to Dr. Lorenz about this, Dr. Myers had asked whether it was necessary at that time, as there was too much outward rotation, although the head remains in the socket as shown by palpation and x-ray. He said that he very infrequently performed that operation; that the neck was inclined to twist backward as time went on. Dr. Myers said he simply repeated what Dr. Lorenz had said.

CASE OF PAIN IN THE HEELS.

DR. MYERS presented a boy sixteen years of age who for the past two years has complained of great pain in the plantar surface of both heels. Dr. Meyers brought him, because there seemed to be so little cause for the pain. Taking into consideration the boy's rapid growth and increase of weight and the fact that the pain was bilateral, Dr. Myers supposed it to be weak foot of some sort, but the diagnosis was not clear. There had been no injury of the plantar fascia or tendo Achillis, no swelling of the bursæ in front or back of that tendon or the one occasionally found on the plantar surface of the os calcis. The longitudinal arch is well preserved, also the transverse arch, and there is no pronation of the feet. The boy complains of pain in the heel, and only in the heel. He is not able to do any work. He had worn plates and his feet had been strapped before he came to St. Luke's, but without relief. The pain is present in the heels only when he walks.

FOREIGN BODY IN THE KNEE-JOINT.

DR. HIBBS presented a boy ten years of age, brought to the Orthopedic Dispensary, June 3, 1904, with the following history: July 17, 1903, while flying a kite from the roof, he stumbled and fell one story, through a skylight; he was taken at that time to a hospital, where a wound in the front part of his knee just above the patella was stitched up and he was discharged in a few days entirely cured. Afterwards he had some pain and stiffness in his knee and he entered another hospital, where he was treated with a plaster cast for a month, then given a brace and high shoe, which he wore for three or four days and then discontinued it. He had no other treatment, and limped around until June 3, 1904,

when he came to the dispensary. At that time there was some stiffness, distinct synovitis, slight atrophy of the thigh and calf; no shortening. He complained of pain and gave a history throughout very much like that of a loose cartilage in the knee joint. When walking along the street he would have a sudden sharp pain, feel something slip and feel relieved. An x-ray showed what was supposed to be a loose cartilage in the joint. While waiting for a bed in the hospital, he came in one day with the knee immovably held at 90°. Another x-ray was taken and the boy was taken into the hospital and the joint opened while at 90°. The supposed loose cartilage was located, but the boy kicked during anesthesia and it disappeared into the posterior part of the joint. The operator was unable to get it, and the wound was closed, and after a few weeks healed, and the boy walked again. He was kept in the ward for two months, under observation. He occasionally complained of pain. A month afterward the foreign body was found and removed. It was a bit of glass at the knee joint. (Exhibited.) It has been there since July 17, 1903, and was probably a fragment of the skylight through which the boy had fallen. It was interesting to note that the boy could go about so well without more serious trouble from July 17, 1903, until November 4, 1904.

ARTHRITIS DEFORMANS OR OSTEOARTHRITIS?

DR. JAEGER presented the patient, a man twenty-eight years of age. There was a family history of rheumatism in both parents. Was perfectly well until seven years old, when he fell into a stream in the Spring, and was exposed to the cold air for over an hour in his wet clothes. The exposure was followed within a few hours by a severe attack of articular rheumatism, affecting many joints. Was very ill for three weeks; after this period convalescence slowly set in and he had no further trouble until he was twenty years old. He then suffered another exposure to cold which was followed by neuralgic pains in the neck. Soon a stiffness of the neck began to set in and it has been growing steadily worse. The pains continued, the spine gradually became rigid and bent forward. He has had, in the last seven or eight years, attacks of rheumatism in different joints, and now we find his whole spine absolutely stiff; there is a large rounded posterior curve, head is bent forward until chin almost touches sternum, the articulations of the ribs are affected and the thorax is immovable. His breathing is entirely abdominal.

Up to two years ago, he had little, if any, treatment; then his physician tried to break up the adhesions in the neck, under slight anesthesia (chloroform). They went with a snap like the report of a pistol. The operation was followed by pain and almost total disability; a week later, a plaster of paris jacket with head spring was applied. The head spring interfered with his occupation, so he took it off about a year ago. Since then he has been getting worse.

A Taylor spinal brace with chin cup has now been applied. Patient also taking salicylates and iron with good results. An x-ray picture giving a lateral view of the cervical vertebræ, is absolutely negative, as no bony changes can be noticed. This is a very interesting fact and corresponds with results obtained by some observers in contradistinction to others who have reproduced radiographs of similar cases showing extensive bony changes.

DISCUSSION OF CASES.

DR. WHITMAN'S CASE. TORTICOLLIS.

DR. MYERS asked whether the supernumerary ribs went down in the direction of the ordinary first and second ribs.

DR. WHITMAN said in this case he supposed the Section had noticed the thickening of the neck on either side. That was due to the supernumerary ribs. They rose well above the first rib and reached downward, apparently attached to the anterior third of the first rib. There were two; one on either side.

DR. MYERS asked if they were from the seventh cervical vertebra.

DR. WHITMAN said he supposed so.

THE CHAIRMAN said the case was interesting to him as a good result. A great many of these cases are seen at the clinic; many for which nothing is done, many operated on and much improved. The after treatment is most important in his opinion and the consequent pain on manipulation very severe, but the children accustom themselves to it and bear the heroic treatment bravely.

DR. JAEGER'S CASE. ARTHRITIS DEFORMANS OR OSTEOARTHRITIS?

DR. MYERS said he thought generally in these cases the proper thing to do is to suspend the patient, and try to force the head and upper spine to a better position. A great many cases are

treated in this way; they are left stiff, but in a more serviceable position. It is thought best, usually, to adopt this mode of treatment.

DR. NAPIER said he had seen a case of rheumatoid arthritis of the neck, at the County Hospital, as bad as this, if not worse. The patient was kept in bed for two or three months with extension which straightened him to some extent. This treatment was followed by the application of a spinal brace, which the speaker thought was indicated in this case. He thought if these patients would submit to extension in bed for some time, they might be materially straightened.

DR. TOWNSEND asked Dr. Jaeger what form of brace he intended to put on.

DR. JAEGER said he would use the Taylor brace with chin cup.

DR. TOWNSEND said he had had a case—a girl—where the chin was as much depressed as this. He had succeeded in a short time, with the Taylor brace and chin piece, in bringing it into position.

DR. TAYLOR said Dr. Townsend was too modest. The case he mentioned was very unusual—a little girl seven or eight years old with a very marked case of stiffness of the spine; rheumatoid or osteoarthritis, he would not say which, positively, but the spine became stiff. This was relieved by a jacket. Afterward the neck became stiff, with frightful pain, and this condition was relieved by the application of the chin piece. In a day or two the chin piece could be removed and she could hold up her head without pain for a few moments. There was very marked and prompt relief.

DR. JAEGER asked if any of the members present had had his experience with the x-ray—whether the pictures showed as negatively as his, in their cases. He said one would imagine with that amount of stiffening, the picture would show something, but here the intervertebral discs were perfectly clear.

DR. FRAUENTHAL said he had had one exposure which showed evidence of inflammation; in that case the x-ray showed it distinctly.

DR. TAYLOR said he did not suppose there was any doubt in the minds of the Section as to the treatment of arthritis deformans, and wanted to know if that was the question. He could show

that the treatment is very effective, and results prompt. A man was brought in a few weeks ago, not supposed to be able to walk. After the application of a jacket, he walked in, easily, the next visit.

THE CHAIRMAN said, as he understood it, Dr. Jaeger's case had received plaster of Paris treatment. The jury mast was dispensed with on account of the man's vocation. He is now to be treated with the Taylor brace, with Sayre modification.

DR. TOWNSEND said that it had been reported that the man could not be treated at Schenectady because there was so much electricity, where he was employed. He would suggest a plaster of Paris collar, without steel, then the electricity would have no effect.

DR. MYERS' CASE. DOUBLE WEAK FOOT, OR CASE OF PAINFUL
OS CALCIS.

DR. GIBNEY asked Dr. Myers if he thought there was any affection of the Achilles tendon, and the duration. The boy seemed to have a breadth on the left side like a thickening.

DR. MYERS said there was no pain except in the center of the heel, which had lasted two years.

DR. GIBNEY said it looked like a case he had seen many years ago; a boy who had been the rounds of all the hospitals, and had been treated for two years without relief. Finally, Dr. Weir dissected the skin and tissue from the heel, made a curved incision back of the heel, turned up the os calcis and could find nothing but a normal condition—sewed up the wound, and the boy promptly recovered. He had been for several years a typical "rounder" with, as was thought, an hysterical heel. The physicians thought they would find rheumatoid thickening round the os calcis.

DR. TAYLOR said he would like to ask a question in regard to painful heel. There are certain cases of very severe pain and thickening in the heel, with or without weak foot, that in his experience had been rather difficult to relieve. He had read a French article awhile ago, in which it was strongly recommended to split the heel down to the bone and curette any diseased bursæ or thickening. The writer reported good success.

DR. WHITMAN said pain in the heel was a common symptom of weak foot, even in a slight degree. The rather elongated heel in this case showed that the boy brought all his weight on the heel, stamping along on it. There certainly was thickening in

the region of the tendo Achillis. He thought in weak foot one found this a prominent symptom. Sometimes one finds bursæ.

He explained the trouble in most instances as due to improper walk—walking on the heel, standing upon it without any spring. If proper foot-rests are applied, distributing the weight, and the patients are taught how to walk to relieve the pressure, which in most cases causes the pain in the heel, they can be cured.

DR. FRAUENTHAL said he would like to mention a case in which the patient walked on his toes for a year and a half on account of tenderness in the heel. He was advised by two surgeons to have an operation as they felt quite sure he had an ostitis. Caldwell took an x-ray, the patient was exposed to the ray for two minutes; that was two years ago, and he has had no pain since. The speaker thought it rather peculiar, as two leading surgeons were quite sure he had an ostitis.

DR. HIBBS' CASE. FOREIGN BODY IN KNEE JOINT. OPERATION
AND X-RAY.

DR. TOWNSEND said that the experience of Dr. Hibbs in not being able to find the body after opening the joint, was a common one. He was fortunate not to get into trouble, and to get the body out, finally. Dr. Townsend had a personal friend who had quite a good-sized body in the knee; was operated on in New York by a prominent surgeon, who tried for an hour and a half without finding it, and the patient was left with a stiff knee. He would not have a second operation. It is necessary to make an effort to fasten these foreign bodies to keep them from slipping back out of the way at the time of operation.

DR. WHITMAN said it was a good method to have the patient assist. He is the only one who can bring the body into view and hold it there. In one case he had arranged to have a needle put in to fix the body. The needle would not go in; finally, it slipped and went into the knee. It was found and the patient held the upper part of it as well as he could, while the speaker cut through, and the foreign body was gotten out. The surgeon could not have done this without the patient's assistance. The trouble was caused by a piece of bone covered with cartilage. It was one inch long, and had troubled him for seven years.

THE CHAIRMAN said he had seen a number of these foreign bodies removed, by the method Dr. Gibney employed in private practice, which was with the assistance of the patient.

DR. GIBNEY said he sometimes tied a string about them.

FIRST ANNUAL REPORT OF THE MILK COMMISSION OF THE MILWAUKEE MEDICAL SOCIETY.*

The Milk Commission appointed by the Milwaukee Medical Society at its meeting of November 25, 1902, held its first meeting and effected a permanent organization, January 13, 1903.

Circular letters setting forth the objects and methods of the Commission were given as wide a circulation as possible, in the hope that a number of the milk producers might become interested in the cause of clean milk. No responses were received except from Mr. F. A. W. Kieckhefer, proprietor of the Edgewood Farms, situated at Pewaukee Lake, Waukesha County, Wis., with whom the Commission later made a contract for the production of Certified Milk and Cream.

The contract for the production of certified milk, which was signed by Mr. Kieckhefer early in 1903, is similar to those made wherever Milk Commissions have been established. It provides for sanitary buildings and surroundings, strict inspection of stock, pure water, clean food, and good care for the cows, frequent examinations of the milk, and such handling of the milk from the time it leaves the cow until it reaches the consumer as will reduce to a minimum the initial contamination.

The chemical standards adopted at the beginning required from 3.5 to 4.5 per cent. of proteids. This was based on antiquated figures which have been shown to be too high, so a change was made. The fat percentage range in the original standard was from 4 to 4.5 per cent.; this proved to be too narrow and was also changed. The present standard requires that the milk shall range from 1,029 to 1,034 in specific gravity, be neutral or very faintly acid in reaction, contain 3 to 4 per cent. of proteid, from 4 to 5 per cent. of milk sugar, and from 3.75 to 4.5 per cent. of butter fat, and shall be free from all contaminating matter and from all addition of chemical substances and coloring matter.

In addition, it must be free from pus and injurious bacteria, and must not have more than 10,000 bacteria of all kinds to the cubic centimeter.

It will be seen that no attempt has been made to secure an unusually rich milk, in fact, this has not been desired; what is demanded is a good, wholesome milk, uniform in composition from day to day, and, as far as possible, *absolutely clean*.

* Read at the Annual Meeting of the Milwaukee Medical Society, January 10, 1905.

In regard to the certification of cream there was very little precedent to guide us, for this is almost new work. We have required that the cream shall be produced and handled under the same conditions as those required for the milk; that it must contain a fat percentage within 2 per cent. of that stated on the label; and that it must be free from pus and injurious bacteria, and must not contain more than 15,000 bacteria of all kinds to the cubic centimeter.

In January, 1904, the plant of the Edgwood Farms was so nearly completed that they wished to begin operations and the preliminary tests and examinations were made. As these were satisfactory, the issuance to them of milk and cream certificates was ordered by the Commission on January 19th.

CHEMIST'S REPORT ON CREAM AND MILK.

	Period	Per cent. Total Solids	Per cent. Fat	Per cent. Sugar	Per cent. Proteids	Per cent. Ash	Acidity
16% CREAM	March 1 to Dec. 14, 1904	Average 24.65 Range 23.69 to 27.30	Average 16.95 Range 15.91 to 19.73	Average 4.28 Range 2.74 to 4.98	Average 2.72 Range 2.35 to 3.12	Average 0.63 Range 0.60 to 0.70	Average 0.126 Range 0.096 to 0.165
MILK	Feb. 5 to Dec. 14, 1904.	Average 13.08 Range 12.43 to 13.78	Average 3.99 Range 3.45 to 4.40	Average 5.01 Range 4.75 to 5.24	Average 3.31 Range 3.00 to 3.88	Average 0.75 Range 0.70 to 0.80	Average 0.160 Range 0.110 to 0.196

In the attached tables the results of the chemical analyses and of the bacteriologist's studies are given in full. It is a matter worthy of mention that even in the preliminary tests, before the work was running with perfect smoothness, the bacteria count did not rise to the limit set by the Commission.

The bacteria count in milk should be looked upon as an index of the care and cleanliness exercised in the handling. It is most satisfactory to see that the average bacteria count during the last six months has been 336 per cubic centimeter of milk, and 354 per cubic centimeter of cream.

A comparison of these figures with the 10,000 bacteria per cubic centimeter for milk and 15,000 per cubic centimeter for cream, which would be permitted under the terms of our contract, and with the 250,000 bacteria to the cubic centimeter, which the Milwaukee Health Department fixes as its maximum limit, shows that the regulations as to cleanliness have been scrupulously carried out, and also shows their wonderful effectiveness.

BACTERIOLOGIST'S REPORT ON CERTIFIED MILK AND CREAM.

MILK			CREAM		
1904		Total Bacteria per c.cm.	1904		Total Bacteria per c.cm.
February	5	2,370	February	13	1,200
February	17	800	March	1	900
March	1	1,500	March	17	600
March	12	750	April	5	675
March	28	625	April	27	550
April	8	550	May	14	625
April	27	525	May	30	625
May	14	590	June	29	450
May	30	550	July	14	400
June	29	400	August	2	435
July	19	425	September	9	390
August	2	410	October	7	380
September	9	375	October	27	375
October	7	350	November	16	300
October	27	325	December	1	300
November	16	275	December	15	250
December	1	250			
December	15	275			
Average for year. . .		630	Average for year. . .		528
Average last 6 months		336	Average last 6 months		354

NOTE.—The analyses of the 32 per cent. cream are not tabulated on account of lack of space.

It has not been possible, with the funds at the disposal of the Commission, to make a complete qualitative study of the bacteria present in the milk at the time of every examination. But through the courtesy of our bacteriologist, Dr. F. E. Darling, we are enabled to give the following report on the findings in the milk examined December 15, 1904. This milk contained 275 bacteria per cubic centimeter.

"The milk was plated fresh, and also after it had stood a few days, so as to give all the bacteria present a chance to develop. The species would remain the same, but the numbers would increase. After spearing off the different colonies I find the following results: All of the plates contained colonies of bacterium coli communis. All but four of the plates contained bacillus acidi lactici. Five of the plates contained bacillus subtilis.

"In all, twenty plates were made, but no other species was determinable. I found no pus germs and after two weeks' time no mould fungi have developed."

It is satisfactory to note that only three varieties were found and that these are all among the common air-borne organisms. This result speaks well for the condition of the cows and for the care in handling the milk.

The visits of inspection of our Veterinary Inspector, Dr. A. S. Alexander, of the University of Wisconsin, have been made at least once a month and have been of a thorough and painstaking character. His recommendations and suggestions have all been of a most useful nature, and have been carried out with all possible dispatch.

The work of our bacteriologist, Dr. F. E. Darling, and of our chemists, Mr. A. S. Mitchell and Mr. Davenport Fisher, has been at all times careful, conscientious, and satisfactory.

During the year 245 cows have been tuberculin tested; of this number four reacted and were condemned and destroyed; while six were held for subsequent retesting before admission to the herd.

L. BOORSE, M.D., *Chairman,*

A. W. MYERS, M.D. *Secretary.*

Milk Commission of the Milwaukee Medical Society.

Occurrence of Koplik Spots in Measles.—In a severe epidemic of measles, O. Müller (*Münich med. Woch.*, January 19, 1904) found the Koplik spots present in 81 per cent. and an initial eruption on the hard palate in 86 per cent. It was only possible to observe 12 cases during the period of incubation; in these the spots were found seven times on the first day of the disease, when the temperature began to rise, when the eruption on the hard palate usually did not show itself before the third day. The author also had occasion to observe an epidemic of rubeola, in which almost half of the cases presented typical Koplik spots, so that these can no longer be considered pathognomonic for measles. The diazo reaction in the latter disease was also studied; it is very constant in appearance, but is of less practical value since it is rarely positive before the end of the first stage or the beginning of the second. There seems to be considerable difference of opinion as to the temperature curve in measles; in most cases seen by the author from the very start, there was an initial rise, then an intermission of one to two days, and finally a continuous fever of several days' duration. In two instances the temperature rose with a remittent curve, and in one the onset was sudden, with high fever.—*Medical News.*

Current Literature.

PATHOLOGY.

Ferrari, A. : A Case of Smallpox Transmitted through the Placenta. (*Brazil Medico*, April 1, 1904.)

A woman, aged twenty years, was attacked with confluent smallpox of the hemorrhagic type, and had an abortion on the eighth day of the disease. The fetus was six months old and presented a generalized eruption of smallpox of the hemorrhagic type, which tended to become confluent at the umbilicus. After the abortion the mother rapidly grew worse and died. The author concludes that, although ordinarily the placenta is a filter which keeps out many infections from the fetus, yet, under certain conditions, it seems to allow the passage of infection from the mother to the offspring in utero.

Bertini, Emilia : Two Cases of Cerebrospinal Meningitis due to the Bacillus of Pfeiffer. (*Riv. di Clin. Pediatr.*, September, 1904, p. 673.)

The author reports 2 cases of cerebrospinal meningitis in 1 of which there was a pure infection with the bacillus of Pfeiffer. In both the germ was derived originally from a bronchopneumonic focus, and penetrated into the cranial cavity, producing meningitis. In the second case there was a mixed infection of the bacillus of Pfeiffer and the diplococcus of Fraenkel. The meninges in this case were primarily involved, and the pulmonary tissues secondarily. It is not always easy in these cases to demonstrate the seat of the primary disease, and it is possible in this case that there had been a simultaneous invasion of the lungs and the meninges by the bacillus of Pfeiffer.

MEDICINE.

Larrabee, Ralph C. : Acute Lymphatic Leukemia in an Infant. (*Boston Medical and Surgical Journal*, January 12, 1905, p. 40.)

Larrabee reports the case of a female, aged six weeks. The white corpuscles were 918,000, of which over 99 per cent. were large and small lymphocytes. Platelets were nearly absent. Death

occurred after a month with symptoms of respiratory obstruction. This probably is younger than any other reported case in which the blood has been thoroughly studied, though possibly Pollman's case of congenital leukemia is genuine. Several writers, failing to appreciate the peculiarities of ordinary leukocytosis in infants, have erroneously reported cases as leukemia, because an increase in white cells not over 50,000 has been made up chiefly of lymphocytes. As to the great decrease in platelets, this has been observed in other cases of lymphatic leukemia, though most authors, basing their statements on the myelogenous form of the disease, state that the platelets are increased or hypertrophied.

Comby, J : Seven Cases of Scorbutus in Infants. (*Arch. de Méd. des Enf.*, No. 10, October, 1904, p. 592.)

In an experience of seven years, the writer states that he encountered 7 typical cases of the disease. The histories of these cases are given.

Summarizing, Comby writes, that five patients were boys and two girls, aged respectively, seven months and a half, nine months, nine months and a half, ten months, eleven months, thirteen months, and nineteen months.

All the infants were artificially fed; in 5 cases Gärtner or "maternized milk" was used, and in 2 cases sterilized milk of Val Brenue.

The disease occurred after five, six and eight months' use of the foods mentioned.

All the children had teeth, and all developed swelling of the gums, or simple ecchymoses, with stomatorrhagia. In all the cases the symptoms appeared after the cutting of the first teeth. Signs of rachitis were noted in most of the patients.

The chief symptom was painful pseudoparaplegia; this, together with subperiosteal hematmata, may be mistaken for acute articular rheumatism, a fracture, simple or specific osteitis, myelitis with paraplegia, Pott's disease, coxalgia, polyneuritis, etc.

Twice a marked cachexia was noted.

The diagnosis is made upon the presence of hemorrhagic germs, which are always found in children afflicted with scorbutus, who have teeth; subperiosteal hematmata, and painful pseudoparaplegia, together with hematmata are indicative. A history of artificial feeding is a guide.

When the disease is diagnosed early, the prognosis is very favorable, but even when scorbutus is recognized late, a cure may be hoped for. Death occurs in unrecognized cases, or in cases with complications.

Patrick, Hugh T.: Convulsive Tic. (*Journal of the American Medical Association*, February 11, 1905, p. 437.)

According to Patrick convulsive tic may be said to be a habit spasm, a sort of motor expression of an imperative impulse. It may develop from some peculiar motion incident to the patient's occupation, but its original cause is generally sensory—some uncomfortable sensation which an attempt is made to relieve by a movement which finally becomes habitual. It does not affect voluntary movements, is diminished by quiet, rest or mental diversion and is aggravated by self-consciousness, observation, excitement, etc. The prognosis varies. In children, it is ordinarily good, but in adults it is often rebellious. The patients are generally nervous and unstable and, in cases of children, unwise parents and rearing are often responsible. With them the habit may be broken by judicious diversion or correction. With adults the treatment is apt to be unsatisfactory, but Patrick thinks the soporific treatment, keeping the patient asleep for two or three weeks at a time, using hypnotics judiciously with frequent changes of the drug, followed by the educational exercises of Brissaud, will be found most effective in the spasmodic torticollis of the adult.

Grünbaum, Otto: Congenital Trophic Edema. (*The British Journal of Children's Diseases*, December, 1904, p. 531.)

Three cases of this peculiar affection are reported, 2 of which occurred in the same family. In each instance the edema involved the lower extremities to a varying extent. In 1 case only the feet were swollen, while in the most severe instance the feet, legs and thighs were much enlarged. From the differential blood counts made in the edematous parts, and comparison with those made from normal tissues, the conclusion is reached that the edema is due to tissue lymph and not to lymph from the lymphatics. From the fact that two children of the same family were afflicted, and that there was an indefinite family history on the maternal side, the author is inclined to consider these cases similar to those of hereditary edema described by Milroy in 1892.

In connection with these cases the conditions that must be

recognized are: (1) Congenital hereditary edema; (a) symmetrical; (b) asymmetrical. (2) Trophic edema developing in later life. (3) Persistent hereditary postural edema. (4) Segmental edema. (5) Scleroderma with edema.

Pershing, H. T.: Hysterical Movements. (*Journal of the American Medical Association*, February 11, 1905, p. 442.)

Pershing gives the diagnostic points of hysterical movements as compared with chorea and convulsive tic. One characteristic is that they are always movements which can be produced voluntarily, though this also may be the case with convulsions from organic disease. The more regular the movement the greater the probability that it is hysterical, but the possibility of hysteria complicating other conditions must not be forgotten. The characteristic movement is a rhythmic oscillation involving one part, and quite usual are certain highly co-ordinated movements, such as jumping or dancing, with or without impairment of consciousness. Chorea may simulate hysteria and be due to similar emotional causes and the diagnosis may be difficult. Hysterical movements are more likely to be regular and grouped in distinct paroxysms and to have more of the staccato movement, but most of the rules for distinguishing these diseases require qualification. Hysterical movements of a limb may simulate Jacksonian epilepsy, but there is no rise of temperature, no paralysis nor mental deterioration. Prognosis and treatment must be guided by general principles. A cure is always possible, though the condition may be obstinate. Moral treatment is imperative. If the patient's mental processes can not be happily directed, everything else will be useless. If they are so directed the rest will be easy.

Spiller, William G.: Symptomatology, Pathology and Treatment of Choreiform Movements. (*Journal of the American Medical Association*, February 11, 1905, p. 433.)

Spiller thinks that the relation of chorea to rheumatism has been greatly overestimated. In most of his cases he could not detect it. He also has not been able to recognize any peculiar facies of the disease, nor does he agree with Gordon and Eshner that there is any peculiar characteristic of the patella reflex in chorea. The arsenical treatment of the disease does not seem to be without disadvantages and should be watched very closely. He has seen arsenical neuritis and idiosyncrasy. The pathology of the disorder is still obscure. The "chorea bodies" are not char-

acteristic. Apoplectic hemihypertonia is distinct from athetosis; the spasm is tonic, unilateral, associated with a little weakness, but not with contractures, develops after an apoplectic attack, and is probably due to irritation of the motor fibres below the cortex. Spiller does not accept Kahler and Pick's theory of the choreiform movements being caused by irritation of the pyramidal tract. It is hard to understand the comparative rarity of hemichorea if this were the case.

SURGERY.

Alapy, Heinrich: Early Operation in Appendicitis with a Special Consideration of Appendicitis in Childhood. (*Arch. f. Kinderhk.*, Vol. xxxviii., p. 241, 1904.)

The writer's experience has been obtained chiefly from a study of appendicitis in children in the first and second decades of life, in which period more than a third of all cases of appendicitis occur.

Appendicitis is, he says, *par excellence* a disease of youth; this is natural, for the appendix in early life contains many lymph follicles, a certain number of which later undergo atrophy.

The conclusions which the writer deduces from his cases hold good, with certain modifications, in this disease in adult life.

Radical measures are more frequently indicated, he thinks, in appendicitis in children. This statement may appear to be contradictory, since a conservative attitude is customary in the treatment of certain diseases in childhood, as, for example, tuberculosis of the bones and joints, whereas, the same condition in adults frequently calls for operative interference.

Appendicitis is a much more severe disease in childhood, according to Alapy, and he quotes experienced authors who share this view.

He observed 85 cases in the Adèle Brody Hospital for Children. Deducting those cases which were discharged without having been operated upon and which were not followed up subsequently, 61 cases remain.

Of cases not operated upon, 4 died as a result of general peritonitis; 4 cases, in which diffuse peritonitis existed, were operated upon and died. Besides diffuse peritonitis there are two forms of sepsis which endanger the lives of patients suffering from appendicitis: an infection which spreads by way of the lymphor blood vessels and which involves areas some distance

from the original focus; this complication was encountered twice by the writer, once in a boy of twelve years, and again in a girl four years old; secondly, a form of sepsis leading to the formation of multiple abscesses.

Under the last head 4 cases are grouped, one of which ended fatally. Six cases of ileus are recorded, of which 4 died.

The writer emphasizes the fact that appendicitis in children is graver than it is in adults.

During the onset children are more liable to suffer from diffuse peritonitis; they are more apt to succumb to a worse or less extensive peritonitis, for the reason that their power of resisting disease is not so great.

In childhood metastatic infections occur as often, intestinal obstruction is strikingly frequent and finally, the tendency to spontaneous recovery is, if anything, less marked than in adult life. It follows that a conservative attitude is not justifiable and that operative treatment should more frequently be resorted to.

As regards the indication for operative treatment, acute and chronic cases must, of course, be separately considered.

Alapy lays stress upon the wide diversity of opinion which exists among surgeons and physicians as to the indication for early operations in appendicitis. A glance at the immense accumulation of literature upon this subject shows that despite many contradictory statements the salient fact remains, that a large percentage of persons suffering from appendicitis, die.

Alapy accentuates the importance of three cardinal symptoms in the early diagnosis of appendicitis: (1) spontaneous pain; (2) hyperesthesia (tenderness on pressure); (3) muscle spasm. These symptoms taken together make a positive diagnosis possible in the great majority of cases. The writer expresses surprise that muscle spasm, the importance of which symptom has long been insisted upon in American, and, to some extent, in French literature, should have been practically ignored in European literature (excepting the French publications).

Zuppinger, C.: Urethra Vaginalis; its Recognition and Sequelæ. (*Arch. f. Kinderhk.*, 1904, Vol. xxxviii., p. 303.)

The writer describes the case of a girl about ten years old, in whom a slight anomaly of the urethra led to apparently incurable symptoms. He accentuates the great importance of an early recognition of this condition. Heppner is quoted as saying that, in

hypospadias in the female, slight anomalies are of the greatest interest to practitioners, because the marked cases prove fatal, while those of moderate severity are often followed by incurable symptoms.

Congenital malformation of the urethra in females is very rare as compared with the frequency of this defect in males. Pediatric literature mentions the existence and mode of origin of this malformation, but does not describe the sequelæ which do not, as a rule, develop until after the age of childhood.

In the case here reported there is a history of incontinence of urine, an attack of cystitis having occurred at the age of five years. The child had been taken to hospitals repeatedly in search of relief, but the cause of the condition was not recognized.

The symptoms were fever, headache, anorexia, eructations of gas, vomiting, anemia and loss of flesh. The enlarged abdomen protruded and a freely movable spherical tumor extended to a point about one and a half inches above the umbilicus. There was slight tenderness on pressure. Attempts to empty the bladder proved to be fruitless, as no trace of a urethra aperture could be found in the vestibule. The clitoris, prepuce and nymphæ were moderately enlarged—the external genitals were otherwise normal. In twenty-four hours 4-500 cc. of urine were voided, micturition, which was painful and difficult, occurring at frequent intervals. Thorough examination of the patient was made under chloroform narcosis. The hymen was found intact and of semilunar form. Upon lifting the upper segment of the hymen, two lateral folds were seen to extend to a point about 1 cm. posterior to the same; between these folds an apparently normal urethral orifice was found. One litre of urine was withdrawn per catheter; the bladder was found to have partly lost its contractile power. Manual pressure caused the evacuation of viscid greyish white urine containing much sediment. A catheter was passed twice daily, the bladder was irrigated with a 1 per cent. solution of boric acid, massage and faradization of the bladder were resorted to and urotropin was administered internally. As the urethral canal was abnormally narrow, dilatation by means of bougies was tried. Eight months after admission the child was discharged improved, and referred to the dispensary for further treatment.

A note is appended, which states that the patient ceased coming to the dispensary. Subsequently the case was demonstrated to the members of a society of Viennese pediatricians by Dr. V. Blum,

who reported its later phases to Zuppinger. Dilatation of the urethra having remained without result, a suprapubic urethral fistula was made by Professor V. Frisch; after this operation the urine gradually became clear, polyuria was much diminished and the general condition rapidly improved.

The child now wears a receptacle into which the urine passes from the fistula; her health is very good, all symptoms of urotoxiemia having disappeared.

Dylon, Céile: The Treatment of Congenital Talipes Equinovarus. (*Arch. de Méd. des Enf.*, No. 10, October, 1904, p. 609.)

Much has been written upon the subject of club-foot, but the writer believes that the bloodless method of treatment is steadily gaining in favor.

Having completely cured several complicated cases of club-foot by manipulation alone, the author draws the following conclusions from her results:

(1) By methodical manipulation congenital talipes équinovarus may be completely corrected.

(2) If the result proves to be unsatisfactory it is proof that the method was faultily applied, or that it was not continued long enough.

(3) The treatment should not be regarded as auxiliary, but as the principal and exclusive method.

(4) By manipulation one restores the normal form as well as the function of the member.

(5) Correction of the position having been obtained, the treatment should be continued for a time in order to prevent recurrence.

(6) In the intervals of treatment the foot should be supported by a small splint.

(7) It is desirable to begin treatment as soon after birth as possible.

A history of each case is given.

Carasol, A. A.: Case of Anthrax in a Child Aged Five Years Treated by Means of Cauterization with Potassa. Recovery. (*Med. de los Niños*, August, 1904, p. 238.)

The patient developed an anthrax pustule on the side of his neck and received the following treatment: The pustule was

washed with a 5 per cent. solution of carbolic acid, and was cauterized with fused caustic potassa. On the following day the pulse was only 90, and other symptoms abated, while the pustule was found to be slightly smaller. The cauterization was repeated, and on the third day the pulse became normal and the general condition greatly improved. The treatment was continued until the sixth day, when repair was allowed to set in, and on the twentieth day the patient was discharged cured.

Muscatello: Multiple Tuberculous Cicatricial Stenosis of the Intestines. Obstruction Due to Ascarides. (*Il Policlin.*, April 9, 1904.)

A child aged five and a half years had been suffering from constipation from the age of six months. She gradually became more costive until the intestine became totally obstructed five days before admission. The diagnosis was tuberculous intestinal stenosis with chronic tuberculous peritonitis. On laparotomy, circular cicatricial bands were found around the intestines, beginning at the last portion of the ileum and extending for a distance of about one metre. There was some fluid in the abdomen. Owing to the gravity of the occlusion, an artificial anus was made in the ileum on the right side of the abdomen, above the first constriction. It was found, on opening the intestine, that its lumen was filled with a large mass of ascarides. The artificial anus was closed after the general condition of the patient had improved, and the flow of feces had been reestablished. Such cases are extremely rare, as but 3 have been heretofore reported in literature. In 1 case there was occlusion of the intestine, in addition to constriction due to adhesions.

HYGIENE AND THERAPEUTICS.

Finizio, G.: The Value of Counting the Fat Globules in Order to Determine the Amount of Butter, and the Value of Babcock's Formula for the Proteids of Milk. (*La Pediatr.*, No. 1, 1904.)

The author attempts to establish a ratio between the number of fat globules counted in a drop of milk, and the amount of fat in

milk. He employed for his counts the appliance of Bouchut, and for the determination of fat percentages, the method of Conrad. He found that there was no relation whatever between the number of globules thus counted, and the percentage of fat in milk, and this he thought was principally due to the variability in the size of the individual globules of fat in milk.

According to Babcock, it is sufficient, in order to find the percentage of proteids in milk, to know the specific gravity of this fluid, and the amount of fat contained therein. The last two figures of the specific gravity divided by four; and the percentage of fat divided by five, are added together, and the sum represents the amount of solids in the milk, exclusive of fat. If the amount of lactose and of salts be subtracted from this figure, the result will be the amount of proteids. The salts and carbohydrates are represented in mother's milk by 6.7, and in cow's milk by 5.2.

Researches by the present author were executed with a view of testing this formula. He tested the specific gravity of a number of samples of milk, determined the amount of fat therein by the method of Soxhlet, and the amount of proteids by the method of Kjeldahl, and compared his findings with those obtained by means of Babcock's formula. He found that Babcock's method gives misleading results, especially in those cases in which the constituents of milk are present in proportions differing from the average.

Mya, G.: On Intestinal Antiseptics and Disinfectants in the Treatment of Infantile Gastroenteric Diseases. A Critical Study. (*Riv. di Clin. Pediatr.*, September, 1904, p. 641.)

Mya seeks to show that the antiseptic treatment of gastroenteric diseases of children is not based on scientific principles, and that it may do more harm than good in some cases. He thinks that the treatment of these conditions demands not merely the writing of prescriptions, but proper attention to all the conditions which enter as causes of infantile diarrheas. He would like to see fewer prescriptions written for children affected with these maladies, and more attention paid to diet and hygiene. Bouchard's theory of autointoxication, which was the basis of the modern intestinal antiseptic treatment, is not founded on scientific principles, and has never been fully demonstrated clinically. The trouble lies in the fact that this theory applies the principles of toxicology to a

totally different branch of knowledge—pathology. The author is convinced that the small amounts of indol, skatol, etc., which are found in the urine and in the feces, if mixed with a healthy man's food would produce in him about the same effect as the fly in *Æsop's* fable. Clinical experience teaches that the process of intestinal putrefaction is far more complex than Bouchard would have it, and that we know as yet but very little on the subject of autointoxication. The use of intestinal antiseptics and antiputrefactive remedies is irrational, because it has never been proved that the symptoms which we wish to relieve are due to an excess of putrefaction of fermentation. It is irrational because no dose which therapeutically can be borne can be hoped to influence the overproduction of fermentative products, so-called. Finally, the use of these remedies is irrational because, when they are given in sufficient doses, they may actually do harm. The author reports several cases of this kind, including a case of poisoning due to the injection of resorcin solutions into the intestine in a child. The author, therefore, rejects all antiseptics in the treatment of gastroenteritis in children, with the exception of the use of 1 per cent. tannic acid injections.

Devoto, A.: On the Frequency of the Reduplication of the Second Sound of the Heart in Children. (*Riv. di Clin. Pediatr.*, September, 1904, p. 662.)

This study is devoted to the elucidation of the causes of the frequency with which the second cardiac sound is reduplicated in children. The author's conclusions are as follows: Reduplication of the second cardiac sound is frequent, both in physiological and pathological conditions. The classification at present used, dividing the diastolic reduplications into pathological and physiological, is not correct, as the so-called pathological reduplications may become transient and may be connected with the respiratory murmur. The so-called physiological reduplications, on the other hand, may become constant, and may be independent of the respiratory function. The difference between these two classes is one of degree rather than kind, and the author agrees with Galli in this respect. Reduplication always corresponds to changes in the pulse, especially in the rate and rhythm thereof. A diminution in the frequency of the heart-beat offers one of the most favorable conditions for the development of a reduplicated second cardiac

sound. The reduplication is heard most distinctly in the expiratory phase of respiration, but may occur indifferently during any part of respiration. It is most marked in mitral affections and in adhesions of the pericardium, but it occurs distinctly also in chorea, in diphtheria and in scarlet fever, with renal complications. In chronic tuberculosis it is not infrequently observed and is related to acute exacerbations of the disease. It occurs more frequently at the beginning of convalescence from acute infectious diseases than at the acme of these affections.

Cozzolino, O.: Under What Conditions Shall Mothers with Albuminuria be Allowed to Nurse their Infants? (*Riv. di Clin. Pediatr.*, September, 1904, p. 681.)

An interesting discussion was held at the thirteenth Congress of Internal Medicine of Padua, during which the author reviewed the question as to whether an albuminuric mother should be allowed to nurse her child. Pinard, Budin and their school maintain that it is safe to allow such mothers to nurse their infants, but the author does not think that their statistics form a trustworthy basis for conclusions in this matter. The institutions with which these observers are connected are lying-in asylums in which the infants are not observed for any length of time. On the other hand, a number of cases are on record in which infants who have been nursed by albuminuric mothers have been under observation for a long time, and developed eclampsia, tetany, epiglottic spasm, or fatal hepatitis with jaundice. In one case, observed by the author himself, there was a diffuse edema as the result of nursing from a mother who had been suffering from what apparently was a simple and transient albuminuria. All these cases show that the milk of such mothers may prove toxic for the infants, and that we should be very careful, at all events, how we allow such mothers to nurse their infants. At the first sign of any disturbances on the part of the nursing, the milk should be discontinued, and whenever the mother shows the presence of true Bright's disease the infant should be permanently weaned.

Malesani, Amelio: The Site of the Apex Beat. (*La Pediatr.*, August, 1904, p. 553.)

As it has been shown that the visible or palpable beat of the heart in children does not always correspond to the apex of that

organ, the author sought to determine by a clinical investigation whether the point of auscultation of the apex corresponded to the apex itself. With this end in view, he studied 14 cases, and in 12 of these he found that the auscultatory area of the apex did not correspond to the site of this part of the heart. The area of auscultation corresponded to the apex-beat, and not to the apex. It was also noted that this area varied in the same patient to the extent of even 1 cm., from one observation to another. In all these 12 cases, the apex-beat was seen and felt at a different point than that where the apex itself was found to be on percussion. The displacement of the apex-beat, the author thinks, is a physiological phenomenon, which is only exaggerated in chorea, as he found in 2 cases of this disease. The apex-beat, on the other hand, does not depend upon the impact of the apex proper alone against the thoracic wall, but upon the impact of a portion of the anterior wall of the heart to the right of the apex. The author thinks that the best place to listen to the sounds of the apex is at the point over which the apex is best felt, inasmuch as at that point there is a direct impact of cardiac tissue against the thorax and the sounds of the heart are therefore directly transmitted through the chest wall. Only in 1 case, he noted that the sounds were heard more distinctly over the apex proper, but this does not mean much, in view of the 12 cases in which the opposite held good. In the 2 cases in which the apex and the heart beat lay at the same point the sounds were, of course, heard at that point with the greatest distinctness.

Pagliari, Filippo: On the Prophylaxis and Treatment of Sprue. (*Riv. di Clin. Pediatr.*, October, 1904, p. 721.)

Nitrate of silver in solutions of from 1 to 3 per cent. strength is the best remedy for the prevention and treatment of parasitic stomatitis. The author obtained such marked success with this remedy that he has rejected all others. The use of silver nitrate in this affection is not new, as West, in his treatise on the diseases of children, has spoken of it, and it has also been recommended by Wladimiroff at the Moscow Congress. Grosz, of Budapest, however, has given us the most complete clinical series in illustration of the effect of silver nitrate in parasitic stomatitis. His prophylactic rule had been during the year 1903-1904 to wash every newly born child's mouth three times daily with a weak

solution of borax. Among 447 newly born infants 146 developed parasitic stomatitis, and the epidemic became so threatening that the maternity wards were closed and thoroughly disinfected. In spite of this, when they were reopened, there were 88 cases of sprue among 268 infants. Grosz then tried painting the mouths of the infants with 1 per cent. silver nitrate solution once daily, as a preventive of sprue and with this method succeeded in reducing materially the number of cases.

The present author's statistics show the efficacy of silver nitrate in a striking manner. Before the prophylactic use of silver solution was begun, there were 344 cases out of a total of 3635 infants. During the period in which the silver solutions were used the number diminished to 67 cases out of 1218 infants. A soft camel's hair brush was used for painting the mouths of these infants and the applications were begun at birth and left off when the patient was discharged from the hospital.

Netter, M.: The Use of Collargol in Diphtheria. (*Annales de Méd. et Chirurgie*, September, 1904, p. 594.)

M. L. Guinon reported to the Société de Pédiatrie (June 21, 1904) 6 cases of grave diphtheria treated by intravenous injections of collargol. One case died; in the remaining 5 cases improvement was so marked that, in spite of previous scepticism, Guinon was led to believe in the efficacy of collargol in cases of toxic and bronchial diphtheria, which ordinarily prove to be fatal.

On December 12, 1902, Netter reported to the Société Médicale des Hôpitaux, early results obtained by the use of collargol in infectious diseases. Since that time he has continued to employ it.

He uses collargol during the first days of the disease.

The writer reports a series of 636 cases of diphtheria in which he administered collargol: 597 patients received, upon admission to the hospital, an inunction of 15 per cent. collargol ointment. In the milder cases the inunction was not repeated; a second inunction was given on the following day in serious cases. In 42 cases which had progressed to the malignant stage, or in which bronchopneumonia had supervened, Netter resorted to intravenous injections; 32 patients received one injection, 9 received two, and 1 received four injections. Ten centigrams, or 5 cc. of a 2 per cent. solution, were used. Seventy-nine patients died, 30 dying

within twenty-four hours after admission. In 1901 the rate of mortality was 20.4 per cent., in 1903 it was 13.2 per cent.; if those cases in which death occurred during the first twenty-four hours be omitted the death rate is found to be reduced to 8.6 per cent.

The use of collargol, coincidently with anti-diphtheritic serum, is advised.

Spolverini, L. M.: Boiled Milk or Raw Milk? (*Riv. di Clin. Pediatr.*, October, 1904, p. 752.)

A comparative study of boiled milk and of raw milk leads the author to prefer raw milk in every way as a nutrient in infants. He concludes that raw milk should be used without any fear whatever in all cases where the proper precautions in milking, in transportation, etc., can be taken. In other cases, and unfortunately these are in the majority as yet in Italy, boiled milk is safer. Sterilization is not favorable in itself, but we employ it in order to escape greater dangers. The use of raw milk in feeding infants is becoming the rule in America, and in some parts of Europe, and in this we are not reverting to old times, but are doing what we know is best for the infant's nutrition. The time will surely come when we shall have everywhere good pure milk which needs not be boiled, and when sterilization will be employed only in exceptional cases.

Kühner-Coburg, A.: Children's Courts. (*Der Kinderarzt*, August, 1904, p. 173.)

The writer urges the need of children's courts. In Germany, in the year 1891, 49,675 individuals, ranging from twelve to eighteen years of age, were tried and condemned. Since then, the number of young law-breakers has steadily increased.

The writer, in summing up, says that there are abnormal phenomena in the moral consciousness of the young which cannot be classed under the legal terms "irresponsibility" and "feeble-mindedness" and which, notwithstanding, are of a pathological nature often causing a tendency to illegal acts. In many these conditions develop gradually; if recognized early and properly dealt with in educating the child, breaches of the law by youthful persons could frequently be guarded against.

In the interest of the public it is urged that teachers, school

physicians, ministers and judges devote time to the study of the development of the child.

The necessity for lectures on psychology and psychiatrics, from the standpoint of the young, as a part of pedagogic instruction in the universities, is dwelt upon.

In schools, the training of the emotions and the development of will-power should be made to counteract a tendency to overburden the intellectual faculties.

Before young persons are publicly brought before a judge for a breach of law, they should be consigned to a Children's Court and only upon a decision rendered here should public trial be resorted to. Special institutions should exist for the physical and moral training of culprits by teachers carefully fitted for the work.

Rosenfeld, Siegfried : Contributions to Statistics on Infant Mortality. (*Archiv f. Kinder.*, vol. xxxix., 1904, p. 1.)

The statistics upon infant mortality have frequently been worked up. It is known how many newborn infants in different countries die in the first year, and also how the sexes differ in this respect. The topographical variations in infant mortality are also known in detail. Our knowledge as to the causes of death and the exact effect of feeding is less accurate and far-reaching.

The present article aims to elucidate certain sides of infant mortality not thus far studied. Special stress is laid upon the difference in the mortality of boys and girls in order to find, if possible, a cause for this variation. For the work the writer utilized Austrian and Prussian statistics. Viennese statistics were also referred to. A series of tables accompanies the article.

Morquios, L. : Three Cases of Nephritis in Chicken-Pox. (*Rev. Med. del Uruguay*, March, 1904.)

The symptoms presented by the three patients whose cases are here reported corresponded exactly to those observed in scarlatinal nephritis in its most common form. The nephritic attack was severe at one period of the disease, but gradually became milder and ended in recovery. The cases observed show that nephritis may develop in the first week of chicken-pox, and that there is no connection between the clinical form of varicella and

the nephritis. It is a complication due directly to the infectious agent of the disease and it may therefore be observed both in the cases with normal and in those with abnormal manifestations.

Graham, Edwin E. : The Nonsusceptibility of the Newborn to Measles. (*New York Medical Journal and Philadelphia Medical Journal*, September 17, 1904, p. 544.)

The writer reports the following case:—A woman, aged twenty-four, developed a marked case of measles one day before her confinement at full term. When the child was born he was found to be perfectly normal and entirely free from any signs of measles. The mother nursed the child from the time of its birth, and at no time did it show the least symptom of measles. When the baby was nine days old the other child of the family, aged eighteen months, developed the disease. It made a good recovery.

Graham reviews the literature on the subject, which shows a relatively large immunity to measles in infants under one year.

Spolverini, L. M. : On the Causes and Effects of a Return of Mother's Milk to the State of Colostrum During Lactation. (*Riv. di Clin. Pediatr.*, 1904, No. 2, p. 83.)

The author concludes, after an exhaustive study of the subject—(1) The most common causes which produce a return to the colostrum state include psychical factors, such as sudden emotions, grief, or fright, or prolonged excitement, and also menstruation, pregnancy, and, in general, diseases in the mother. Irregular or suspended nursing, such as occurs in diseases of the infant also acts as an external cause. (2) The age of the mother, her social condition, and the time which has elapsed after the labor have nothing to do with the phenomenon under consideration. (3) The intestinal disturbances and other symptoms which are observed in infants in such cases, are the effects of the abnormal state in which the milk is found. (4) Such disturbances are almost always of short duration and but rarely require more than a temporary interruption of breast-feeding. (5) In examining milk suspected to possess colostrum characters the microscopical examination is decisive, but an oxidizing ferment is almost always found in this milk, and may serve as an aid in diagnosis.

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Original Communications.

THE WORK OF THE BABIES' WARDS OF THE NEW YORK POST-GRADUATE HOSPITAL FOR CONVALESCENT CHILDREN.*

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The collection of infants and young children in a hospital presents many problems beyond the mere medical treatment of the cases. As far as lasting good to the children is concerned, the purely medical function may be the least important feature. The reason of this is twofold—first, the effect of the hospital itself upon the child; and, second, the essentially faulty life conditions that send the child to the hospital. Unless these two factors are attentively considered, the results of care and treatment will often prove unsatisfactory and ephemeral. Work in any one line of charity, if properly conceived, almost invariably opens up new and converging lines of effort that are necessary to employ if the work is to be made permanent. To treat a child successfully for pneumonia in a hospital, and then send it to damp and unhygienic rooms in a tenement house, is but to invite another attack of the original disease; hence, the housing problem looms up for consideration. Again, after relieving an infant of gastroenteric irritation in hospital or dispensary, the work is only half done unless steps are taken to procure pure, fresh milk for future feeding, so that the food problem must be considered. As the hospital is not a good place for recuperation, when the patient is discharged the work will often fail in lasting results unless the child can be

* Read by title before the American Pediatric Society, Detroit, Mich., June 1, 1904.

thoroughly invigorated, and here convalescent homes in the country at once claim attention.

Hospital statistics, as such, are of little value unless they take into consideration the ultimate condition of the patient. Until hospital managers are able or willing to extend their work along these lines of permanency, or have agencies that will do so, their work fails in much of its possibilities. No place more than a hospital gives the chance to trace needs and opportunities to their ultimate sources. It should not alone be a place for treating the sick, but a social laboratory, where future prevention should be constantly studied in connection with the cases under observation.

In considering the lasting good of the child, the hospital itself merits the first consideration. For infants and very young children it should simply serve as a temporary place of refuge, where all hygienic, medicinal and surgical appliances should be of the latest and best types. After the acute illness has subsided, the case should be immediately removed, as, otherwise, there will be constant relapses and reinfections. The latter will occasionally occur even with the best nursing and under the finest hygienic surroundings in the hospital. No hospital should admit infants or very young children to its wards unless all the appliances are of the very best as regards hygiene, air space, ventilation and skilful nursing. The nurses must likewise be sufficient in number, one to 5 or 6 cases, and specially trained in this line of work. Even where all these conditions are fulfilled, the greatest care and watchfulness will be required and the infants must be discharged at just the right time, when the acute symptoms have subsided and before a general cachexia or atrophy has had time to develop. In order then to ensure a good convalescence, the infant must be kept in the hospital for only a short time, it must be carefully guarded from auto- and hetero-infection while there, and, finally, sent out to recuperate under favorable conditions. When detained too long, certain phenomena invariably develop. Those especially to be noted are a slow but progressive loss of weight not entirely dependent on the original disease, dryness of the skin, hydremia, hypostatic pneumonias of a peculiarly insidious character and great susceptibility of the mucous membranes. The latter are specially shown by bowel irritation, and vaginitis in female infants.

At the Babies' Wards of the Post-Graduate Hospital, forming a separate division of the hospital, the greatest care is exercised

to avoid the dangers of prolonged hospital environment. Constant vigilance is employed in preventing infection from entering or spreading. On admission the clothing is removed and retained in the examining room and the child given an antiseptic bath before being taken to the wards. All female children have a smear taken from the vagina, which is immediately examined in order to ensure freedom from the latent infection which is so frequently found in these parts. No child is admitted from a house where any contagious disease exists, slips furnished by the Board of Health being constantly consulted. When a mother visits her child she is furnished a gown before being admitted to the wards. All stools and napkins are promptly disinfected. No mattresses are employed, the bedding consisting of woven wire springs that can be washed, covered by blankets. When the child is discharged, all the bedding and clothing are placed in a large sterilizer and subjected to live steam.

The wards are large, sunny, well-ventilated, and with all the best and most modern hygienic devices. The infants are daily removed to a sun parlor at the top of the building in order to get a complete change of air, and, when the weather permits, to a roof garden. The plant here in existence and the plan of treating the cases now serve as a model for many similar institutions throughout the country.

In order to make permanent the benefits of the hospital, the infants are kept only during the period of acute illness, and then discharged, but still kept under observation outside. This system started with the plan of simply having a visitor, but has eventuated in methods of fresh-air treatment that are aimed to ensure a thorough convalescence, if such a thing is possible. In 1890, a voluntary committee of three ladies, at the request of the writer, undertook to visit and report on the cases discharged from the hospital. As the work grew in importance it became evident that a more systematic effort was required, and, accordingly, a special committee was formed from the Ladies' Auxiliary Committee in 1894. A paid visitor, who could work at all seasons, was appointed, and this plan has been in operation ever since. During the past five years a female physician has done this work. A combination of medical knowledge with tact and observation here give the best results. A blank that is of proper size to be attached to the regular hospital history is filled out by this visitor, so that the attending physician can at once be posted as to the life

conditions of the child, and hence be governed as to the time of discharge from the hospital and what steps may be necessary to take in order to improve faulty conditions. The following items are placed upon this chart:

Name.

Address.

Age.

Number of rooms, No. light, No. dark, No. on air shaft.

Sanitary condition of house.

Sanitary condition of street—Fault landlord or city.

Physical condition of parents.

Intelligent care of children at home.

Condition of child second week after return to home.

A full history of the child's parentage and personal condition having been already taken by the examining physician on admittance, a pretty complete record is in the hands of the attending physician for his guidance in managing the case.

The visitor has placed in her hands a certain sum of money to purchase clean, fresh milk, when necessary, and to relieve any pressing needs that may interfere with the child's convalescence. She also sees that the food is properly prepared, medicines given, and the hygienic surroundings improved as much as possible. Rules of instruction in feeding and hygiene for mothers, translated into German and Italian, have proved of great value. The work of the visitor has been in many other ways of far-reaching utility. Landlords have been brought to terms in putting premises in a sanitary condition rather than be reported to the Board of Health; fewer children are deserted than formerly, as a special effort is made to make the mothers realize the crime of deserting their children; all existing charities are made use of in as far as they apply to the case in hand, such as the free ice in summer, depots for milk distribution and all the fresh-air agencies. The mothers have explained the great advantage of allowing the children to have a change, even although it be only for a day, but efforts are made for a longer outing. It is believed that this work has been of the greatest utility to our convalescent children during the ten years that it has been systematically employed. Many facts of great social interest have also been brought out. Some of the records have been carefully studied and tabulated. Two tables have been thus prepared, covering different periods,

TABLE NO. 1.
HOSPITAL STATISTICS.

BEING A RECORD OF 1,000 CASES, EXTENDING FROM MARCH, 1900, TO MARCH, 1902.

CONDITION OF STREET.		CONDITION OF HOUSE.		CONDITION OF ROOMS.	
Good.....	464	New and clean.....	200	Good.....	405
Fair.....	157	Old and clean.....	245	Bad.....	161
Bad.....	153	New and dirty.....	19	Fair.....	205
Not indicated.....	226	Old and dirty.....	197	Not indicated.....	229
	1,000	Good.....	89		1,000
		Bad.....	37		
		Not indicated.....	213		
			1,000		
TOTAL NUMBER OF ROOMS.		NUMBER OF LIGHT ROOMS.		NUMBER OF DARK ROOMS.	
1 Room.....	58	1 Room.....	384	0 Room.....	93
2 Rooms.....	165	2 Rooms.....	169	1 ".....	208
3 ".....	327	3 ".....	58	2 Rooms.....	203
4 ".....	168	4 ".....	46	3 ".....	46
5 ".....	59	5 ".....	7	4 ".....	3
6 ".....	12	6 ".....	3	5 ".....	0
Not indicated.....	211	Not indicated.....	331	Not indicated.....	447
	1,000		1,000		1,000
NUMBER OF ROOMS ON AIR-SHAFT.		NUMBER OF BOARDERS OR LODGERS.		PARENTS' DRINK HABITS.	
0 Room.....	267	0 Lodger.....	386	Good.....	338
1 ".....	49	1 ".....	69	Bad.....	31
2 Rooms.....	104	2 Lodgers.....	39	1 drinks.....	36
3 ".....	37	3 ".....	12	Not indicated.....	595
4 ".....	2	4 ".....	3		1,000
Not indicated.....	541	5 ".....	5		
	1,000	Not indicated.....	486		
			1,000		
PARENTS' AVERAGE EARNINGS.		PARENTS' NATIVITY.		PARENTS' RELIGION.	
\$1-5.....	173	American.....	231	Catholic.....	365
5-10.....	379	German.....	143	Jewish.....	242
10-15.....	152	Irish.....	94	Protestant.....	52
15-20.....	12	Other Nations.....	532	Mixed.....	236
Not indicated.....	284		1,000	Not indicated.....	105
	1,000				1,000
MARRIED, WIDOWED, OR DESERTED OR SINGLE.		NUMBER OF OTHER CHILDREN.			
Married.....	724	0 Others.....	202		
Widowed.....	79	1 ".....	213		
Deserted.....	90	2 ".....	202		
Single.....	7	3 ".....	95		
Not indicated.....	100	4 ".....	78		
	1,000	5 ".....	28		
		8 or more.....	54		
		Not indicated.....	128		
			1,000		

TABLE NO. 2.
HOSPITAL STATISTICS.

BEING A RECORD OF 700 CASES, EXTENDING OVER A PERIOD OF ONE YEAR, FROM
MARCH, 1903, TO MARCH, 1904.

SANITARY CONDITION OF STREET.	SANITARY CONDITION OF HOUSE.	NUMBER OF ROOMS.
Indicated in only 146 Report Cards.		1 Room..... 25
Good..... 33	Good..... 125	2 Rooms..... 64
Fair..... 21	Fair..... 88	3 "..... 115
Bad..... 18	Bad..... 96	4 "..... 74
Not indicated..... 74	Not indicated..... 391	5 or more..... 29
		Not indicated..... 393
146	700	700
NUMBER OF LIGHT ROOMS.	NUMBER OF DARK ROOMS.	NUMBER OF ROOMS ON SHAFT.
1 Light room..... 137	1 Dark room..... 72	1 Room..... 8
2 " rooms..... 64	2 " rooms..... 91	2 Rooms..... 38
3 or more..... 93	3 " "..... 11	3 or more..... 11
Not indicated..... 406	Not indicated..... 526	Not indicated..... 643
700	700	700
NUMBER OF LODGERS.	AGE OF CHILD.	NUMBER OF OTHER CHILDREN.
1 Lodger..... 17	6 Months or less..... 229	0 Others..... 138
2 Lodgers..... 17	1 Year..... 118	1 "..... 171
3 "..... 9	2 Years..... 156	2 "..... 123
Not indicated..... 657	3 "..... 73	3 "..... 76
700	4 "..... 64	4 "..... 54
	5 and over..... 60	5 or more..... 64
		Not indicated..... 74
		700
HOME CARE OF CHILDREN.	PHYSICAL CONDITION OF PARENTS.	AVERAGE EARNINGS OF PARENTS.
Good..... 105	Good..... 486	\$1-5..... 84
Fair..... 97	Fair..... 11	10..... 220
Bad..... 105	Bad..... 103	15..... 112
Not indicated..... 395	Mixed..... 79	20 or over..... 48
700	700	Not indicated..... 236
		700
NATIVITY OF PARENTS.	RELIGION OF PARENTS.	MARRIED, WIDOWED, DESERTED OR SINGLE.
American..... 168	Catholic..... 326	Married..... 533
Irish..... 48	Jew..... 152	Widowed..... 53
German..... 54	Protestant..... 144	Deserted..... 59
Other Nations..... 307	Mixed..... 46	Single..... 13
Mixed..... 123	Not indicated..... 32	Not indicated..... 38
700	700	700

While it is impossible to get complete data in all cases, it is believed that these tables will give some idea of the work actually done and the good accomplished.

The efforts of the hospital to aid its convalescent children do not end with the work of the professional visitor and the help she can muster. Two other special agencies are constantly employed, which, although not under the same management as the hospital, have grown out of its work and are closely affiliated with it.

A fresh-air home at Sea Cliff, L. I., specially built and equipped for convalescent children, is open from May to November, and takes all needed cases for intervals of from two weeks to several months. It is situated on a high promontory, sufficiently wooded, with a porous soil, overlooking Long Island Sound. Everything that can conduce to healthy, outdoor living is here supplied. A resident physician and nurses, specially trained in the Post-Graduate Hospital, keep careful oversight of the cases, and no child is discharged until it is believed that the improvement will be permanent.

Several years ago the author resolved to try the plan of boarding out in the country bottle-fed infants who were not doing well in institutions or in their homes. At his request several ladies started the nucleus of such a work, which has since grown.

The Speedwell Society, located at Morristown, N. J., a very healthy district, has resulted and is in operation during the whole of the year. The plan of this Society is to board out infants and very young children in country homes in the vicinity. The success of this method of placing bottle-fed infants in private homes where they can have individual attention has been thoroughly demonstrated during the three years of the operation of this work. This is true even if the woman taking the baby into her own home is fairly ignorant. The mothering she gives the infant often makes up for her lack of accurate knowledge, and this is especially true in marasmus cases. However, a paid physician and two trained nurses keep these cases under constant observation. It has been found that bottle-fed infants and cases of general malnutrition do better under this plan of treatment than in the best-managed institutions. Many of our youngest cases have thus been completely restored to health and strength after the acute illness has been relieved in the hospital.

PRIMARY ADENOSARCOMA OF THE LIVER IN A CHILD OF NINE MONTHS.*

BY L. EMMETT HOLT, M.D.,

Professor of Diseases of Children, College of Physicians and Surgeons (Columbia University), New York.

The patient was a male child admitted to the Babies' Hospital April 4, 1904, on account of an abdominal tumor.

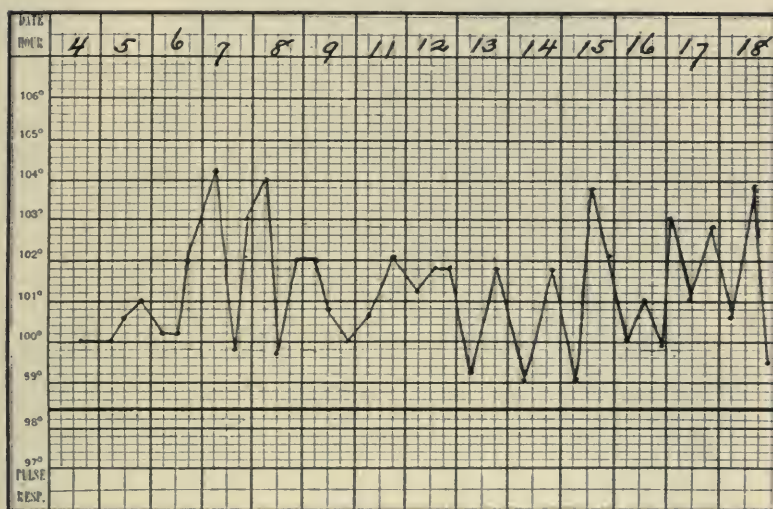
The parents were both living and healthy, also one other child; there was a history of tuberculosis in the father's family, but nothing else which bore even remotely upon the case could be ascertained. The patient was born at term after an easy labor, had been breast-fed and was reported always to have been a pale child but well nourished and had gained steadily in weight. The child did well up to the age of seven months when, on account of some digestive disturbance, chiefly vomiting, bottle-feeding was substituted for part of the nursings. The vomiting had recurred at varying intervals until the patient was admitted. The stools were green and undigested and the child lost weight, though not rapidly. The only symptoms noticed had been this disturbance of digestion until the week before admission, when a tumor of the abdomen was discovered on account of which the child was sent to the hospital.

The examination on admission showed a well developed but pale and rather poorly nourished child; weight $15\frac{1}{4}$ pounds; four teeth; nothing abnormal in heart or lungs. The abdomen was moderately distended, being distinctly more prominent on the right side than on the left. Here was felt a large tumor forming a hard mass extending, at the ensiform cartilage, about two inches to the left of the median line; at the umbilicus, a little to the left of the median line. Its lower border extended in a curved direction from just below the umbilicus to the crest of the ilium. Its surface was smooth and semi-elastic. Continuous flatness on percussion extended from the sixth rib to the lower border of the tumor. A mass was felt in the left side of the abdomen corresponding to the spleen. Neither by palpation nor percussion could the liver be made out as separate from the tumor. The skin

* Read before the Sixteenth Annual Meeting of the American Pediatric Society, Detroit, Mich., June 1, 1904.

over the abdomen was normal except for a slight distension of the superficial veins. No other masses could be felt in the abdomen or in the pelvis; genitals normal. There was slight edema of both feet and legs; no paralysis. There were no nodular enlargements except slight ones in the cervical region. The examination of the blood showed hemoglobin, 55 per cent.; leukocytes, 17,000; fresh blood, normal.

An exploratory needle was passed into tumor about its middle and 2 cc. of bloody fluid withdrawn. The microscopical ex-



TEMPERATURE CHART IN CASE OF ADENOSARCOMA OF THE LIVER.

THE CHART SHOWS THE COURSE OF THE TEMPERATURE
AFTER THE OPERATION.

amination showed, red blood cells, fatty liver cells, fat droplets and small round mononuclear cells. Culture sterile.

After the child had been under observation for three days, as it was growing steadily worse, exploratory incision was decided upon. Up to this time slight fever had been present 100°-101°F., and occasionally vomiting, but there was no jaundice and no absence of bile from the stools was noticed. The child looked very sick; took food very badly.

The operation was performed by Dr. A. L. Fisk under cocain anesthesia. A transverse incision was made about two inches be-

low the costal margin over the most prominent part of the tumor. The tumor was found to be, as had been suspected, an enlarged liver, surface smooth and glistening. The liver was aspirated in various directions, but no pus found; but at one point, which seemed softer than the rest, an opening was made and a drainage tube inserted into the substance of the organ. This passed into a cavity apparently made up of broken down liver tissue as from it a grumous material was discharged, but no pus.

Considerable shock followed, but on the whole child bore it very well. After the operation the child lived thirteen days with a continuous but irregular temperature (see chart), steadily increasing prostration and gradual though not rapid loss in weight. Five days after the operation the leukocytes were 13,000. There were no local symptoms of importance, the wound was dressed daily and did well. The tumor did not change essentially in appearance. There was occasionally vomiting but no diarrhea and little abdominal distension. The liver seemed slightly smaller during the last few days. Death occurred from exhaustion.

PATHOLOGICAL REPORT BY MARTHA WOLLSTEIN, M.D.

Autopsy, twelve hours after death. Body, well nourished; edema of feet and hands; operation wound 4 cm. long to the right and above the umbilicus. Wound normal.

Liver.—Measures 19 cm. long, 21 cm. wide, 10 cm. thick; weight, 735 grams; of a light brown color, anterior surface mottled, with lighter and darker areas. There was a rounded, bulging and apparently fluctuating mass measuring 9 × 7 cm., which projected somewhat above the level of the rest of the organ. This extended nearly to the lower border of the liver. The lower border of the liver is sharp not rounded. The relation of the tumor to the rest of the liver is well shown in the section from which the photograph (see illustration) was taken. The operation wound, 2 cm. long, penetrates the softened prominent tumor mass at its centre. The anterior part of this protruding tumor fluctuates, but this is due to necrosis; the rest of the tumor, exposed by section of the liver, is a firm, nodular, yellowish-white color mottled with larger and smaller hemorrhagic areas and separated from the liver substance by thin capsule. The softened portions are limited to the anterior part. In the interior there are found only a few scattered softened nodules, some of which are black in color from hemorrhage. The liver substance outside

the growth is firm and moderately fatty. The posterior surface of the liver shows a mottling due to the presence of the tumor.



ADENOSARCOMA OF THE LIVER: SECTION SHOWING RELATION
OF THE TUMOR.

Near its upper border are three small separated yellow nodules. The liver capsule is smooth, there is no peritonitis and apparently

no thickening of the interlobular connective tissue septa. Gall bladder 4 cm. long contains fluid bile; ducts are all pervious.

There was a slight recent pericarditis and a moderate bronchopneumonia. All the other viscera were essentially normal, except the kidneys which showed slight recent nephritis, no metastasis being present anywhere.

Cultures from the heart, liver, spleen and kidneys gave a pure growth of the streptococcus pyogenes. This was evidently a terminal infection.

Microscopical Examination.—In sections from the periphery of the tumor, the capsule is seen to be composed of a layer of cirrhotic liver substance in which newly-formed bile ducts are found in small numbers. The growth is made up of lobules of liver cells, arranged in atypical columns; the central vein is often at one side of the lobule, and again it cannot be found. Small interlobular blood capillaries are numerous, and many small hemorrhages have taken place in and between the lobules. The epithelial cells show many karyokinetic figures.

Sections from the softened hemorrhagic portion near operation wound showed two varieties of cells. The epithelial cells resembling those of the liver are arranged in the adenomatous lobules as in the rest of the tumor. In addition there are irregular, larger and smaller masses of round cells whose nuclei stain deeply and are comparatively large. These cells lie in a very delicate stroma of connective tissue fibrils. Small blood vessels are very numerous, and hemorrhages into the tissue have taken place. The softened areas seen in the gross specimen are due to large hemorrhages in this portion of the growth which is evidently a small round cell sarcoma. The sarcoma nodules lie between the adenomatous ones and in places they grow into the latter, *i.e.*, between the columns of epithelial cells are irregularly-sized sarcoma nodules. At the capsule the sarcoma cells infiltrate the connective tissue for some distance in contrast to the adenoma which is sharply limited.

The liver substance outside the tumor maintains its lobular structure perfectly. The liver cells contain smaller and larger fat droplets, especially at the periphery of the lobules. The connective tissue septa are not thickened—there is no general cirrhosis.

Remarks.—No exactly similar case can be discovered in medical literature. But two liver adenomata in children have been

found recorded: one aged twenty months in which Weichselbaum¹ made the microscopic examination, and the other in a boy of twelve years, described by Pye-Smith.²

The case here reported would come under the head of the *hepato adenoma proprium* of Witwicky,³ the cells of the neoplasm originating from those of the liver, as distinct from the epithelium of the bile ducts, and being arranged in columns. Such growths do not become malignant and form no metastases.

Primary congenital sarcomata of the liver have been described by Pepper⁴ in an infant eight weeks old; by Heaton⁵ at the same age; by Parker⁶ in a baby of three weeks, Pepper⁷ at seven weeks, Gee⁸ at five months and by De Ruyter.⁹ All of these were round-celled sarcomata. Meisenbach's¹⁰ case, four months old, was a myxosarcoma. Windrath¹¹ describes a spindle-cell sarcoma in a baby less than one year old. Bauman and Forbes' case¹², eleven months old, was a round and spindle-celled sarcoma. West's¹³ case, eight months old, was a medullary sarcoma. Henoeh¹⁴ gives no microscopic details of the sarcoma he reports in a child of two and a half years. Roberts¹⁵ reports a medullary sarcoma in a girl twelve years old. Several of these cases were accompanied by metastases in the suprarenal capsules and in the lung. In addition to these primary cases quite a large number of secondary sarcomata in the liver in children have been reported.

The combination of adenoma and sarcoma would seem to be unusual among the tumors of the liver occurring in infants. The presence of a distinct capsule around the whole neoplasm, and, the fact that the sarcoma is not found in all parts but only in the central zone, would seem to argue that the adenoma was the original process, to which the sarcoma was added at a somewhat later date.

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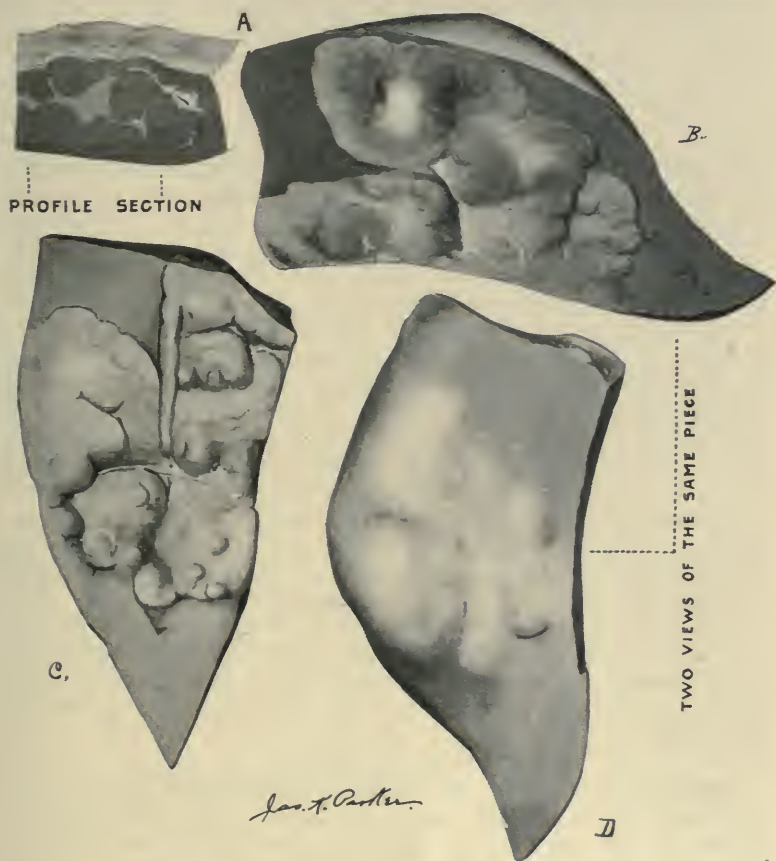
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DISCUSSION.

DR. ABT.—In an autopsy on a female child, aged twenty-one months, who died of typhoid fever, complicated by multiple gangrene of the skin, an adenoma of the liver was found, which was unsuspected during life. In addition to the adenoma, the liver showed catarrhal cholangitis, which had no connection with the adenomatous condition. Upon examining the liver, it was observed that in the interior portion of the left lobe there was an area nearly the size of a lemon which stood out quite sharply from the surrounding tissue, and was irregularly circular in outline. The central portion of the growth was of a white color and seemed to be composed of fibrous structure. The periphery of the tumor was more yellowish or liver colored in appearance; it was raised and nodular. The larger nodes were half the size of a dime, the smaller ones the size of a pea. Microscopic sections, from the tumor, showed columns of liver cells which were not arranged in the form of acini. These columns of cells were separated from each other by trabeculæ of connective tissue. The connective tissue bands seemed continuous with Glisson's capsule. The individual cells were of very large size and many of them contained fat globules.

The question may arise whether this tumor should be considered an adenoma or simply a nodular hyperplasia. Ziegler believes that these tumors are true adenomata, although he thinks that there is no sharp line to be drawn between these and nodular hyperplasia on the one hand, and an adenocarcinoma on the other. Orth believes that a true hyperplasia of the liver parenchyma may occur. He has observed them in cases where a large portion of the liver has been destroyed by abscess, syphilis or echinococcus. Orth has observed hyperplasia resembling an adenoma in granular atrophy, and in a case of thrombosis of the hepatic vein. The same condition may occur in cirrhosis. This

hyperplasia may present a nodular appearance, or it may be single or multiple, the nodes varying from a pea to a cherry in size. Orth emphasizes the point that these hyperplasias, or adenomata, may eventually become carcinomatous. It may be mentioned in this



ADENOMA OF THE LIVER, DR. ABT'S CASE.

FIGURE D.—THE APPEARANCE OF THE TUMOR AS SEEN ON THE LIVER CAPSULE.

FIGURE B.—CUT SECTION SHOWING THE NODULAR ARRANGEMENT WITH FIBROUS STRUCTURE BETWEEN THE NODULES.

FIGURE C.—CUT SECTION SHOWING LARGE AND SMALL NODULES OF THE TUMOR.

connection that in the case which we report, there was no evidence of malignancy. The tumor was circumscribed, the cells did not invade the connective tissue, and there were no metastatic growths.

The occurrence of adenomata in the livers of children

must be regarded as rare. Musser has reported 2 cases, one in a boy of twelve years, and another in an infant twenty months old. Birsch-Hirschfeld in 400 sections, in newborn children, observed adenomatous nodules in 2 cases. These adenomata could be recognized because they stood out prominently, also on account of their pale color; they were sharply circumscribed and a connective tissue capsule occurred on the periphery of the tumor. Microscopically, the tumors were made up of liver cells, the cells themselves showing granular changes and containing several nuclei. The significance of these adenomata permits of considerable speculation. If we consider them in the light of Cohnheim's hypothesis, which holds that retained embryonal tissue may cause neoplastic growth, then we may understand how the tumors may gradually change from simple to malignant adenomata. Observation has shown that these nodules take on a progressive character, *i.e.*, they grow constantly larger in size, and the exact moment when benignancy ends and malignancy begins, is impossible to determine. The case which was examined by Birsch-Hirschfeld is of interest in this connection. A boy twelve years old, presented a tumor of the liver, which had persisted for more than a year. Previously he had been perfectly well. The first sign of illness was indicated by a loss of appetite with vomiting and diarrhea. This condition was followed by ascites; after this, he lost rapidly in nutrition, and death occurred as a result of extreme marasmus. During the whole period of the illness, there was but slight icterus. A microscopic examination of the tumor showed that in certain areas the liver cells retained their radial type and presented a normal appearance, while in other areas, the cells were arranged irregularly, the interstitial connective tissue was increased and was very vascular. The cells invaded this connective tissue, which indicated in itself the malignant nature of the tumor.

Diagnostic Import of Cerebrospinal Fluid.—Siemerling (*Berliner Klin. Woch.*, XLI., No. 21) is convinced that examination of the cells in the fluid, and of its chemical and physical characteristics affords most valuable information. Pronounced lymphocytosis indicates irritation of the meninges. If the fluid becomes turbid on addition of magnesium sulphate, this indicates an increase in albumin content. In case of a fresh hemorrhage, all the blood corpuscles can be centrifuged out, leaving the fluid limpid. This chromodiagnostic may, in certain cases, give a clue as to the source of the hemorrhage. He relates the particulars of 75 cases in which the fluid was examined. The results were positive in 37 out of the 38 cases of progressive paralysis, and he is convinced that the lymphocytosis observed may be regarded as an early symptom of this affection. It was accompanied by cloudiness on addition of magnesium sulphate in all the cases. He also reviews the literature on the subject.—*Journal of the American Medical Association*,

CONGENITAL OBLITERATION OF THE BILE DUCTS.*

BY J. P. CROZER GRIFFITH, M.D.,
Philadelphia.

This is one of the uncommon causes of icterus in the newborn, yet a number of cases have been reported. There have been several collective investigations made, among them those by Giese (*Jahrb. f. Kinderh.*, 1896, Vol. XLII., p. 252) and Gessner (*Ueber Kongen. Verschl. der grossen Gallengänge*, Dissertation, Halle, 1886), but the most noteworthy contribution to the literature of the subject is that by John Thomson ("Congenital Obliteration of the Bile Ducts," 1892). This writer tabulated 49 cases verified by autopsy, and added one of his own. In a later publication (*Allbutt's System of Medicine*, 1897, Vol. V., p. 253) he estimates that not more than 60 or 70 cases have been published. Among other serviceable articles of comparatively recent date are those by Ralleston and Hayne (*British Medical Journal*, 1901, Vol. I., p. 758), Skormin (*Jahrb. f. Kinderh.*, 1902, Vol. LVI., p. 196), F. Parke Weber (*Edinb. Med. Journ.*, 1903, Vol. LVI., p. 111), Arkwright (*Edinb. Med. Journ.*, 1902, Vol. LVI., p. 156), and Mohr (*Ein Fall v. Kongen. Icterus*, etc., Dissertation, Berlin, 1898). A more extensive bibliography will be found in some of them. My own case, of which the notes are necessarily meagre, owing to the shortness of the time of observation, is as follows:

Fred Corbin. Age ten days. The family history is entirely negative, no similar disease having occurred in it. The child was born at term, apparently well. Meconium was passed per rectum until the age of three days. Some infection of the cord now appeared to be present; the stump fell about the eighth day. On the third day after birth the mother noticed jaundice. With this was associated frequent vomiting, constipation, and loss of appetite. These symptoms grew more severe, the jaundice becoming a deep yellow, and the baby was brought to the Children's Ward of the Hospital of the University of Pennsylvania, May 23, 1903, on the tenth day after birth, or the seventh from the time the symptoms commenced.

* Read before the Philadelphia Pediatric Society, January 10, 1905.

Examination showed a small, emaciated infant. The skin and conjunctivæ were extremely icteric; the pulse was feeble and rapid; the respirations were accelerated. Vomiting was very frequent, the child being unable to retain any food swallowed. When given by the stomach tube food was rejected. Constipation was absolute. Bile was present in the urine.

Death took place twelve hours after admission, there having been, in the meantime, no movement of the bowels. A short time before death general edema appeared and became very marked.

While in the hospital the temperature varied from 96.8° to 99.2° F., the pulse from 140 to about 155 and the respiration was about 42.

Autopsy.—The autopsy showed a complete obliterating stenosis of the common bile duct situated about one-quarter of an inch above its opening into the intestine. The duct at this point was hard and cordlike, and could be easily rolled between the fingers. No bile could be forced through it from the gall bladder, although the duct above the stenosis could be easily distended by pressure on this viscus. The gall bladder was of normal size and filled with bile. The surface of the liver and the intestines in the vicinity were stained with bile, from contact with the bladder. The liver on section was of normal color. There was no bile in the duodenum. The pancreatic duct was patulous.

A microscopical study of the liver was made by Dr. C. Y. White, who reported as follows:

"The liver shows a moderately severe grade of fatty degeneration of many of the cells, and cloudiness of the remaining ones. In some sections there is a slight increase in the amount of fibrous tissue surrounding the bile ducts, but not to any noteworthy extent. In other sections there is certainly none. The intrahepatic bile ducts are small, and the majority contain granules of bile pigment. The common duct above the obstruction is patulous, and the walls show a good deal of fibrous tissue."

Pathological Anatomy.—The lesions characteristic of this disease consist in obstruction somewhere or other in the course of the biliary passages. There may be no discoverable trace of the bile ducts, or of a portion of them, or they may be represented by a fibrous cord only. The gall bladder may be absent or may be much dilated. In some cases the ducts are apparently normal in size and position, but there is a total obliteration of their lumen at some one point; or, the ducts may be dilated above the point

of obstruction. The lesions may affect one or all of the main bile ducts. The liver is generally enlarged, firm, and either of a natural or a dark green color, and exhibits lesions of hypertrophic cirrhosis. In the case now reported there was, however, no noteworthy degree of cirrhosis present. The blood vessels are seldom affected. The spleen is enlarged. If the case has run a chronic course, the liver may exhibit atrophy.

Pathogenesis.—The cause, often obscure, appears to be of different nature in different cases. In many cases it is possible that there has been some influence acting, which prevented the proper development of the ducts during fetal life. It is a striking fact that the disease is liable to occur in several members of the same family. This supports the theory of some congenital failure in development. In other cases the existence of an obliterative inflammation seems probable, although the cause and place of origin of this is uncertain. According to some views this inflammation starts as a cholangitis within the liver itself, and descends to the main bile ducts. The development of the cirrhosis goes *pari passu* with the cholangitis. Another view places the cirrhosis as a lesion secondary to the complete obliteration of the ducts. The case I report would support the latter view. There had not been time for a secondary cirrhosis to develop to any extent. In some cases there may have been a fetal inflammation of the mucous membrane of the ducts. The narrowing thus produced may not effect a complete obstruction at first, but a catarrhal swelling results, which finally stops entirely the passage of bile. The inflammation may then spread to the walls of the duct, and complete atresia follow. This may take place either before birth, or after it. The irritation of a gall stone in the duct may rarely have been the starting point of the inflammation. It is also conceivable that the origin of the inflammation may be syphilitic, and that there has been a gummatous deposit in the bile passage. Yet if this is so we ought, as Thomson points out, to find associated signs of syphilis elsewhere. In fact, there seems little evidence that congenital syphilis plays a role of importance in the etiology.

Symptoms.—The chief symptom is icterus. This is present at birth, or develops within the first week, less often in the second week or later. In a case reported by Köstlin (*Canstatt. Jahrsber.*, Vol. III., p. 293) it did not appear until the age of six months. The color is intense and persistent, and often of a greenish hue.

The second characteristic symptom is the occurrence of acholic

stools. This may be present from the beginning, or there may be at first evacuation of normally colored meconium, if the blocking of the ducts has occurred late in fetal life. In such cases the blocking cannot be the result of an arrest of development. It is even possible that ordinary yellow movements may be present for a time, and these give way later to acholic stools; five weeks in a case reported by Skormin (*l. c.*) This is, however, of rare occurrence, and can only be explained on the ground that the congenital narrowing did not become complete obliteration until a considerable time after birth. The urine is intensely bile stained. Fever is not a symptom. Vomiting is apt to occur. Hemorrhages from the umbilical cord, and into the different parts of the body constitute a very characteristic symptom. The children do not, as a rule, show any evidence of malnutrition at birth, but this eventually develops if the case is prolonged. Death occurs in convulsions or sopor or from exhaustion. The course of the disease is seldom acute. The fatal ending comes generally only after several weeks, or even months, although it may occur in the first week of the disease.

Diagnosis.—This rests chiefly upon the persistent jaundice and the presence of acholic stools, yet the recognition of the disease is not so easy as it would at first sight appear. Cases of simple icterus neonatorum may sometimes be extremely persistent and intense, and the diagnosis from obliteration of the bile ducts, may be in doubt for some time. I recall one instance particularly in which jaundice lasted several weeks, and in which for some time I was in doubt. The stools were whitish and glistening, and clearly contained an excess of fat, and apparently a deficient amount of bile. Bile, however, was proved to be present. There was also persistent fever, although sepsis could be excluded with tolerable certainty. Recovery took place slowly.

A tendency to hemorrhage in various parts of the body is a characteristic of other forms of intense persistent jaundice, as well as of the one under consideration. It is quite frequently associated with jaundice as a symptom of sepsis in the newborn. In these cases, however, the existence of fever and of stools showing the presence of bile, together with the early presence of symptoms of severe icterus, aid in excluding congenital obliteration of the bile ducts as the pathological condition present.

In this connection, too, attention must be called to the fact that a family predisposition may exist in other forms of icterus.

This has been emphasized in the very instructive paper by F. Parkes Weber (*l. c.*). He points out the fact that Hanot's Disease (biliary cirrhosis with chronic jaundice) may occur in different members of one family. He also describes a class of cases which he designates "Simple Persistent and Congenital Persistent Jaundice," which he believes probably due to an obliterative inflammation of bile ducts analogous to, but of more limited extent than, that present in the cases of Thomson's type. Thomson, too, refers to fatal cases with the symptoms of obliteration, but with patulous ducts found at autopsy. He regards them as examples of different stages of the same disease.

In "Congenital Obliteration of the Bile Ducts," as described by Thomson, there is nearly always present also a congenital biliary cirrhosis, as already pointed out. Rolleston and Hayne (*l. c.*) believe that the cholangitis and the cirrhosis developed at the same time, and that the former, starting within the liver, descends to the larger hepatic ducts, producing, finally, occlusion of these. If this is true, it places the condition, in many respects, very close to Hanot's Disease. The case now reported does not, however, support this theory.

The difficulty, then, in distinguishing congenital obliteration of the bile ducts from other forms of severe icterus, fatal or otherwise, becomes evident. The cases described by Arkwright (*l. c.*) illustrate this well. In these, fourteen of the fifteen children of one mother, suffered from icterus soon after birth and ten died. In two of them, however, the icterus disappeared before death, and in none of them is it certain that the stools were typically acholic. Some of the cases suggest strongly in most respects obliteration, and the probability is great that the diseased condition was identical in all of them. Yet the diagnosis of obliteration cannot be made, if we consider the disease to be uniformly fatal. The cases of Pearson ("Underwood's Diseases of Children," Tenth Edition, 1846, p. 168), in which of eleven children of one mother, ten died of jaundice soon after birth, and one of jaundice at six years, are all strongly suggestive of obliteration. Yet in the absence of autopsy the diagnosis cannot be certain, and the question also arises, as to the nature of the lesion in this six-year-old girl.

In this connection I wish to detail the salient points of the history of a case of icterus seen with Dr. J. E. Talley and already reported before this Society. (See ARCHIVES OF PEDIATRICS, Sep-

tember, 1904.) The infant was the fifth child of its parents. The first three are alive and well. The second suffered from decided jaundice soon after birth, which lasted for weeks. The fourth child had intense icterus, and died about the third day of life, no other cause for death being discoverable. The patient under Dr. Talley's care developed jaundice shortly after birth. This became intense. The urine was bile-stained; the stools were dark-colored. There was no fever. On the tenth day a widespread eruption of purpuric spots and subcutaneous hemorrhages developed. There was a trace of blood from the umbilicus at about three weeks of age. A puncture of the toe for a blood-examination, made when the child was a month old, was followed by hemorrhagic oozing, which lasted for a week and was controlled with the greatest difficulty. The purpuric spots were still appearing. The jaundice had been lessening. By six weeks from birth the jaundice was much better, and few new cutaneous hemorrhages were developing. The stools soon after this became a yellow color.

This case, from the family history and the severity of the very characteristic symptoms, points strongly to the presence of obstruction of the bile ducts, which had not yet reached the degree of absolute obliteration, since the stools appeared to contain bile. The fatal case in the family could properly be considered an instance of the disease, so far at least as the diagnosis can be made from the symptoms. Concerning the one which recovered previously, we can hardly form a conclusion. The case seen by us would have received this diagnosis had it ended fatally. The result proves that if obliteration were present this could not have been of a permanent nature.

Although, then, the inflammatory process which in fetal life or in the first days of the existence of the newborn, though not causing complete obstruction at once, usually tends to grow worse, may it not be equally possible that in rare cases the progress may instead be arrested? It would seem at least possible that a congenital narrowing, due to defect of development or to a cholangitis, did, in fact, exist in Dr. Talley's non-fatal case; but that the actual severe obstruction, with consequent symptoms, was of a nature susceptible of recovery, as, for instance, a catarrhal inflammation, which completely closed for a time an already narrowed duct. This would be a condition entirely analogous to that probably present in some of the cases of congenital stenosis of the pylorus.

Prognosis and Treatment.—The prognosis of cases of obliteration, if this is complete and organic, is absolutely bad, and treatment can be only palliative unless the thought of operative procedure be entertained. An operation, however, of this gravity on subjects at such an early age appears to offer little hope.

[The discussion of this paper will be found on page 303 of this number of ARCHIVES OF PEDIATRICS].

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Vulvovaginitis in Children.—W. J. Dukelsky (*Russki. Vrach*, April 12 and 19, 1903) distinguishes two kinds of vulvovaginitis in childhood—the infectious and the noninfectious. The infectious variety is in 80 per cent. of all cases produced by gonococci, while diplococci and other as yet unknown bacteria are responsible for the remaining 20 per cent. There are certain characteristic features in the symptoms and course of these types. Thus the gonorrheal variety is invariably chronic though beginning acutely; it is furthermore apt to be complicated with bartholinitis, which does not occur in the other varieties. The form of vulvovaginitis due to diplococci and the unspecified bacteria is characterized by an acute course and rapid recovery. Finally, the noninfectious form is always catarrhal and chronic. The disease is, according to the author, most frequently given to the children by their mothers, and it seems that the little ones are susceptible irrespectively of their general health. Infection may even take place during labor. Whenever the transmission is direct, as in sexual abuse, the resulting disease is usually very severe and apt to present serious complications.—*American Medicine*.

An Undescribed Symptom of Rickets.—Neurath (*Wien. Klin. Woch.*, 1903, No. 23, p. 668) describes a symptom of rickets, which when present, he believes points with certainty to this disease. It consists of a peculiar change in the shape of the fingers in which an apparent sinking of the joints gives the proximal, middle, and terminal phalanges a spindle-shaped appearance. When holding the hand against the light the outline gives the appearance of a string of pearls. More rarely the proximal and middle phalanges are conical in shape, while the terminal phalanx in the region of the nails appears thickened, giving the appearance of a nine-pin. Still more rarely is the terminal phalanx thickened in a dorsopalmar direction, giving the fingers a typical drumstick appearance. Thickening of the toes is rare. The thickening is probably due to an infiltration of the periosteum. The condition is found only in rachitic children, and especially in those under one year. In older children the disease is more severe. The condition is always associated with enlargement of the epiphysis and ends of the ribs.—*American Medicine*.

SCLEREMA NEONATORUM; REPORT OF A CASE WITH COMPLETE RECOVERY.

BY JACOB SOBEL, M.D.,

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Dispensary, New York.

From the time that Uzemberius first described his case in 1718 until the present day the term "sclerema neonatorum" has been used to signify a most varied array of conditions, and it is only within recent years that this chaotic state of the subject has become clarified. My object in recording this case of sclerema neonatorum is to call attention to some interesting facts in connection with it rather than to enter into any lengthy discourse, or to mention an extended bibliography. A complete and exhaustive discussion of the disease can be found in the articles by Soltmann (Real Encyclopädie der gesammten Heilkunde, XVIII. Band, 1889), and in the more recent monograph by Friedrich Luithlen, entitled "Die Zellgewebsverhärtungen der Neugeborenen (sclerema edematosum, adiposum und sclerodermie) Wien, 1902."

A composite description, so to say, of this affection as found in the various text books, states that sclerema neonatorum is a disease occurring at birth, or shortly thereafter, usually in illegitimate, weak or premature infants, mostly in foundling or lying-in asylums; it is characterized by a progressive hardening of the skin and subcutaneous tissue, subnormal temperature, increasing asthenia, superficial and weak respiration, collapse and death. Though occasional mention is made that some cases recover, the general impression prevails that these cases invariably die. The following case presents, it seems to me, some features of unusual interest and hence I submit a somewhat lengthy history.

Previous History.—Abigail M., age five weeks, born in New York City, was brought to me at the dispensary on April 1, 1902, because of obstinate constipation. The mother stated that the child never had a movement without an enema and that frequently four days passed by without any evacuation. Incidentally, she asked if there "wasn't something wrong" with the baby's arm. Labor was precipitate, the mother being up and about her work in a stooping position, the child striking the floor. She said that at

birth the baby was "black-like" and "no life in it," for twenty minutes; the mother threw water over it, rubbed it with whiskey, cut the navel cord and tied it; the placenta expressed itself spontaneously. The mother was forty-two years old, had had five other children, all alive and healthy; no abortions, no specific history or evidences of lues after a thorough examination of both parents. *During the entire period of gestation she was compelled to work very hard, at times with little or no nourishment and lived amid very poor surroundings.* The mother did not take charge of the child until the tenth day; her daughter of twelve had told her, however, that while the midwife (who arrived after the birth) was washing the child she noticed that the left arm in the deltoid region was "black and bluish" and firm. On the tenth day the mother noticed the same condition in the buttocks, and on the twelfth day the husband told his wife that "it looks like ossification." The child was not quite full term, was breast-fed, suckled well; she was less robust than all her other children. At birth the baby was thin and small, weighing about 6 pounds; she would lie quiet, and appeared sore when picked up; the cry was very weak. Her other children, the mother said, were red after birth, cried lustily and kicked about, while this one did not move the hands or feet. This child was "altogether different from my other babies," she finally remarked. On the fourth day both breasts of the child were swollen; the right one was squeezed and blood is said to have been expressed. The foregoing statements were corroborated by the midwife, who, to use her own words, "told me that she didn't expect it to live; the body was starved from lack of nourishment." On the third day she noticed "the flesh kind of pale and firm-like, not as loose as other babies"; here and there "body was purplish; other babies were pinkish and strong, this baby was weak and delicate." At birth the child "wasn't able to cry, and acted as if it wanted sleep." The hands and feet were helpless and "there was no action to the body until it was rubbed and bathed."

Status Presens.—Baby fairly well nourished, nothing unusual about the head, eyes or mouth, thoracic and abdominal viscera normal; umbilicus healed and clean, no jaundice, no evidence of mastitis. Temperature 99° F., per rectum. No albumin in the urine. In both deltoid regions the skin and subcutaneous tissue were firm, boardy and somewhat irregular to the touch; there was a bluish discoloration. Supinator regions of both forearms simi-

larly involved. The region of both pectoralis major muscles was also hard, but less so than the deltoid regions. The gluteal regions and inner sides of the thighs were even firmer and more indurated than the deltoid regions; the skin of the back was distinctly thickened. Induration also extended to the lower abdomen anteriorly and laterally. In the deltoid, gluteal, pectoral, supinator and inguinal regions the skin could not be raised from the subcutaneous tissue. Over the back the skin could be raised with difficulty, but was decidedly thickened. The face was absolutely free, the skin over the occiput was thick and hard and there was a slight enlargement of the postcervical glands. No generalized adenopathy. Pressure over the affected areas and handling of the baby caused pain. No pitting on pressure at any point. The indurated areas were defined from the surrounding normal skin and *the distribution was strikingly symmetrical*. The joints were not involved.

From the tenth day until she came to the dispensary the mother rubbed the entire body of the infant with sweet-oil and gave a hot bath daily. Enemata of soap-suds were given for the constipation, but no movement occurred for three to four days at a time. At the first visit I gave tablet triturates of calomel 1-10 grain and advised a continuance of the sweet-oil massage and warm baths. On April 4th the case was presented to the Manhattan Dermatological Society, because, as I stated at the time, (1) of its comparative rarity; (2) of the unusual duration without death and (3) because of my opinion that the prognosis in this particular case (for reasons to be mentioned) was good. The diagnosis was concurred in, but the general opinion of the members was that the disease was progressive and that the child would eventually succumb to its influences.

April 5th.—Temperature 99.2°F., condition the same. Widerhofer pill (calomel gr. 1-10, Ferri carb. sacch. gr. ss) *t. i. d.* Warm baths and rubbing with sweet-oil to be continued.

April 7th.—Bowels have moved. Temperature 98.8°F.

April 9th.—Temperature 98.4°F. One movement since last visit. Massage and baths have been continued. Buttocks appear somewhat softer.

April 14th.—No evacuation of the bowel from the eleventh until this morning. Temperature 99°F.

April 16th.—General condition about the same. Pectoral and supinator regions are somewhat more yielding.

April 23d.—Pills have been taken regularly. Mother con-

siders skin softer. The tight deltoid regions and buttocks are less firm. Bowels are more regular. At this visit the following was prescribed:

R Ungt. Hydrargyri (U. S. P.)

Ungt. Acidi Boracici, 10 per cent. āā 0.5

Twelve portions were given and the mother was instructed by the nurse and myself as to the method of massage. The nurse gave the first inunction at the dispensary; these were to be used for six days over the different parts affected and a warm bath given on the seventh day. Pills were discontinued.

April 30th.—Buttocks more improved. Bowels still unsatisfactory. No salivation or other untoward effects. Urine negative.

May 3d.—One passage during the past six days. Baby appears bright, smiles, nurses well. Decided improvement over both deltoids and on inner sides of thighs. Buttocks are especially softer, more particularly the right one. Skin of back softer and not so thick. Temperature 98.8°F. Inunctions continued.

May 17th.—General improvement. Buttocks are becoming markedly softer.

May 25th.—Skin over back much softer and more supple. Buttocks almost well; improvement in latter region distinct and decided. Left deltoid better, but still indurated. No pain.

June 2d.—Has passage every day at present. Progressive general and local improvement. Skin of lower back and abdomen softer and more movable. Both deltoids, especially left, still show a small indurated area.

June 5th.—Presented for the second time at the Manhattan Dermatological Society, where the improvement was considered remarkable and all were agreed as to the good prognosis. After this I lost track of the case until September 24th, when I learned that the last inunction was given on June 18th (forty-eight in all). From the latter date and up to the twenty-fourth of September hot baths and massage with sweet-oil were given. The child was then a little over six months, had six teeth, was breast-fed and well nourished. The only sign of induration was a small area the size of a twenty-five-cent piece over the left deltoid region. The other parts were soft and the skin could readily be raised from the subcutaneous tissue. The skin was normal in color, there was no pain on pressure. Temperature 98.6° F.

The case was presented for a third time to the Manhattan Dermatological Society, and great pleasure was expressed at the ultimate result.

October 2d.—Bowels regular, passages once or twice daily. Movements of arms and legs normal, child active. No pain on handling.

October 23d.—Skin and subcutaneous tissue normal. Child well.

The child was also presented by me to the members of the Harlem Clinical Society, and to the West End Medical Society by Dr. J. J. Philips, with whose permission I publish the following:

“MY DEAR SOBEL:

“The dates of the presentation of the case of sclerema were the May and June, 1902, meetings of the West End Medical Society. This Society as a body concurred in the diagnosis, agreed with the treatment, but thought that the massage which the child was getting had much to do with the softening of the skin *et al.* At the first meeting, no one had seen a case of similar nature recover and consequently at the second presentation of the case, one month later, they were very glad to have this view of the situation brought to their notice. There were present Drs. Kerley, Mendelson, Dawbarn, Newcomb and others.

“Sincerely yours,

“JAMES J. PHILIPS, M.D.”

Epicritic Remarks.—There are some features in this case which correspond to the classical description of the disease and others which are rather atypical. The history of somewhat premature birth, of its occurrence at birth, or very soon thereafter, in a weak and feeble baby, the existence of firm induration of the skin and subcutaneous tissue without pitting on pressure, the non-existence of cardiac disease, the inability to raise the skin from the subcutaneous tissue, and both from the deeper parts, all fit in closely with the picture of sclerema neonatorum. The departures from the usual description are the good general condition of the patient, the recovery, the irregular condition of the indurated areas, the absence of subnormal temperature at all times during the period of observation, the freedom of the calves and the involvement of the pectoral region. That recovery is considered

rare may be noted from the prognosis of almost all authorities on the subject. Some, like Barr (*Allbutt's System*, 1900, Vol. VIII., p. 683), say, that "in a few partial cases recovery has taken place." Jacobi and Winckel consider involvement of the chest exceedingly rare; in fact, they state that it is always free; and Luithlen writes that the chest is seldom involved and, if so, very late in the disease. Subnormal temperature while most important as a corroborative symptom is not necessarily present in all cases. The more complete the case the more likely is the temperature to be subnormal. Garrod states that in incomplete cases the temperature may be normal, and Barker's case, with a rise in temperature, has been recorded in literature (Koplik). Then again, it must not be forgotten that this case came under my observation for the first time at the end of the fifth week, at a time when the active symptoms of the disease may have been on the wane. Nor is the skin always smooth and regular as some of the books tell us, nor a bluish discoloration incompatible with the diagnosis.

The obstinate constipation may be accounted for possibly by a serous infiltration of the intestinal mucosa similar to that of the skin and subcutaneous tissue, just as Soltmann attributes the cry in these cases to an edema of the vocal cords. The pain on pressure over the affected areas and upon handling, so evident in this case, was due, in all probability, to the pressure of the infiltrate upon the nerve endings.

Without desiring to enter into any of the numerous etiological factors advanced, it seems to me that in this case the previous poor health and deprivations of the mother are deserving of consideration. On this particular question P. S. Abraham (*Allbutt's System*, 1900, Vol. VIII., p. 683) says: "Even in those instances in which the affection begins in utero, or shortly after birth, without apparent previous disease, the intrauterine nutrition may have been at fault." And Jacobi, in speaking of rachitis, says: "I have known women to bear healthy or rachitic children, according to the condition of health or ill-health during the year preceding parturition." Experience shows that sclerema commonly occurs in illegitimate, weak or premature infants, and is found in the vast majority of cases in foundling asylums; it rarely, if ever, is seen in private practice, or among the better classes. Is it that the mothers of these children belong to a type in whom the mode of life predisposes the embryo to lack of nourishment; in other words, is the disease one of intrauterine malassimilation? Or, can

the striking symmetrical involvement of the parts in this case be advanced as corroborative of the contention of Somma and Ballantyne, that we must look to neuro-pathological influences for an explanation of the pathogenesis of this affection?

At this point it may be well to mention that further studies have established the fact that sclerema neonatorum, sclerema edematosum and scleredema (Soltmann) are to be considered one and the same condition in contradistinction to sclerema adiposum (Fettsclerem or symptomatic sclerema).

The great confusion surrounding the former was due to the fact that it was not until recently recognized that the hardness, mobility and pitting upon pressure were proportionate to the extent of serous infiltration into the subcutaneous tissue; so that the parts may be doughy or hard, immovable or partly so, and may or may not pit upon pressure. Sclerema adiposum, on the other hand, is very aptly described in Soltmann's article as follows: "Sclerema adiposum is not a disease in itself and has only a symptomatic importance; it is the end phenomenon of protracted illness, with loss of fluid from the body, and is observed mostly in the diarrheas of infancy and childhood—enterocatarrh, enteritis, cholera infantum—and in some forms of pneumonia."

My reasons for giving a good prognosis were: (1) The non-involvement of the muscles of the face, thus enabling the child to continue at the breast and procure good nourishment (the mother at this time was better fed); (2) the good general condition of the child at the time of presentation; (3) the fact of its being alive at the end of five weeks without general involvement; (4) the presence of a normal temperature throughout the period of observation; (5) the absence of pulmonary symptoms; (6) the moderate atmospheric temperature during the months of April to October.

In Luithlen's exhaustive monograph on sclerema edematosum, adiposum and sclerodermie, he criticises very severely 5 cases reported as sclerema; one of these, that of Garrod, corresponds so very closely to my own case that I feel inclined to take issue with him. He expresses the opinion that these 5 cases were all sclerodermie, excluding the diagnosis of sclerema upon the following facts common to all; the good general condition, the absence of other internal disease, the normal pulse, respiration and temperature, the long duration of the disease (cure after one to four months), the presence of circumscribed areas from which the

affection spread until other parts were involved, and the absence of pitting or its rapid disappearance.

He then proceeds to establish a diagnosis of sclerodermie upon the following diagnostic points of Cruse: the good general condition, the firm, hard, unyielding skin, the cure after a long period, and the sharply defined areas as compared to the "continuous crawling over the greater part of the body of a cold, edematous infiltration of the skin" in sclerema neonatorum (Ueber Sclerodermie Bei Säuglingen. Crusei Jahrb. f. Kinderh., Leipzig, 1878-79, Vol. XIII., pp. 35-48). If the diagnosis of sclerema were to be excluded on the aforementioned diagnostic points of Cruse, then it is difficult to understand what we are to consider sclerema neonatorum incompletum, unless Luithlen denies its existence an opinion contrary to that of Henoeh (Vorlesungen über kinderkrankheiten, Tenth Edition, p. 47), and others. In my case, the induration on the buttocks and in the deltoid regions was so great and the pain so evident, as to lead to the suggestion, by some of the gentlemen to whom it was presented, that a myositis might be present. Despite the departures from the classical description of the disease, I have no hesitancy in expressing the belief that in this case we were dealing with an incomplete form of sclerema edematosum. It is my belief that in these cases recovery is not uncommon, and it would be interesting, for me, at any rate, to learn the basis upon which Luithlen would establish such a diagnosis.

While mercurial ointment was used on "general principles," I am of the opinion that it was the massage which affected the result, by improving the tone of the general circulation and thereby probably causing absorption of the indurated products.

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Bacteriuria in Children.—Mellin (*Jahrb. für Kinderh.*, Vol. LVIII., No. 1), has found only 11 cases on record in the literature, and adds 10 observed at Helsingfors. The colon bacillus was responsible in 8 cases, and the staphylococcus albus in 2, a lad of ten and an infant. The symptoms were unimportant, and treatment with salicylates and local rinsing out the bladder with a weak disinfectant speedily cured the condition.—*Journal of the American Medical Association*.

ERRORS IN DIET AS A CAUSE OF INFANTILE DIARRHEA.*

BY ST. GEO. T. GRINNAN, M.D.,

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The theories in regard to the causes of diarrhea in infants have included everything that the lively imagination could suggest, from the changes of the moon to the shape of the nursing bottle.

The number of deaths during the first year of life is far in excess of any other period of life, and the number of deaths during the first five years of life is four times as great as any other period of five years' duration. In the United States (census of 1900) 30.5 per cent. of all deaths occurred under five years of age. In New York City 30.2 per cent., in Louisiana 31.1 per cent., in England and Wales 36 per cent., in Virginia 30.7 per cent. of all the deaths, respectively, occurred under five years of age. Only 5 per cent. die of old age from seventy to seventy-four. The annual death rate for all ages is 175 per thousand in the United States. Considering the population under one year of age the death rate under one year in Bradford, England (census of 1900) was 171 per thousand, in New York City 189 per thousand, in New Orleans 229 per thousand, in Richmond, Va., 300 per thousand, in Charleston, S. C., 419 per thousand. Considering the population under five years of age the death rate under five years in New York City is 66 per thousand, in New Orleans 71 per thousand, in Richmond, Va., 94 per thousand, in Charleston, S. C., 132 per thousand. In 1890 the death rate under five years of age in New York City was 96 per thousand. Rabagliati says that one-fourth of the children in England and Wales die during the first five years of life. The death rate in New York City for all ages has decreased from 25 per thousand in 1890 to 20 per thousand in 1900. The death rate in Newark, N. J., for all ages has

* Read before the Richmond Medical Society, May 23, 1904.

decreased from 27.4 per thousand in 1890 to 19.8 per thousand in 1900. In Richmond, Va., the death rate for all ages has increased from 26.7 per thousand in 1890 to 29.7 per thousand in 1900.

Out of 39,381 deaths under five years of age in New York (census of 1900), diarrheal diseases claimed 8,278; diphtheria came next with 1,762 deaths. At all ages typhoid caused 1,776 deaths, and small-pox only 16 for the same period. The period of greatest mortality from consumption in New York is from 25 to 30 years of age, showing 2,133 deaths against 8,278 deaths from diarrheal diseases under five years of age for the same period (census of 1900). In Virginia out of 7,748 deaths under five years of age the diarrheal diseases claim 1,115; whooping-cough comes next with 260. The greatest mortality from consumption was from 20 to 25 years of age, claiming 561 deaths during the same period (census of 1900). In the United States, during 1900, 10.7 per cent. of all deaths were caused by consumption; 10.2 per cent. of all deaths were caused by pneumonia, while 6.6 per cent. of all deaths were caused by diarrheal diseases in infants under five years of age.

For every 100,000 of population the following is the death rate by months, according to the census of 1900:

	June.	July.	Aug.	Sept.	Feb.
Total	123.2	150.8	145.	131.9	
Diarrheal diseases ..	11.1	36.5	32.7	21.2	2.8
Consumption	12.9	14.1	13.4	12.9	14.4

In view of these facts we are forced to conclude that the mortality of young infants has not improved as compared with the mortality at other ages in recent years.

Koplik says that in large cities more than one-half of the deaths among infants under the age of twelve months is caused by summer diarrhea. In Paris Chaterinkoff found that of 20,000 children dying of intestinal disorders fully four-fifths were bottle-fed. Of 1,943 fatal cases collected by Hope, Meinert and Ballard only 61 cases, or 3 per cent., had been breast-fed exclusively. Fatal cases among nursing infants are very rare.

It would be impossible to consider properly the causes of diarrhea without bearing in mind the digestion of the infant. Traube and Escherich have shown that in the young child stom-

ach digestion is of less importance than intestinal digestion. The younger the infant the less active the digestion of the stomach. Hall, in his *Physiology*, says, "The investigation of recent years tends to minimize the importance of the stomach not only in digestion, but also in absorption." Only 1 per cent. of water is absorbed from the stomach. McFaydn demonstrated that the stomach of a dog, with hydrochloric acid sufficient to dissolve bones, did not destroy bacteria that passed through the stomach into the intestine. Miller has shown that an acidity of 0.16 per cent. was required to prevent bacterial growth, and Van Puteren has shown that the acidity of an infant's stomach is really 0.08 per cent.

It is well to bear in mind that milk is a fluid outside of the body only. We have solid matter in the stomach, solid matter in the colon and 90 per cent. liquid in the small intestine. We may consider the alimentary canal of an infant one year old as a tube fifteen feet long, practically closed at both ends. The fact that milk is digested nearly, if not altogether, by the small intestine, explains why indigestion in infants induces diarrhea.

Occasionally diarrhea is caused in a nursing infant by an excess of fats or proteids in the mother's milk. In such cases the error is often caused by too frequent nursing. Asparagus eaten by nursing mothers will cause diarrhea in their infants. The mother's milk may be affected by iodine, arsenic, antimony, zinc, lead, mercury, iron, aloes and belladonna; these, however, are not frequent causes of derangement of the intestine of the infant.

Holt says that acute gastric indigestion, acute gastritis and chronic gastric indigestion are caused by excess of proteids and other abnormalities of milk. The synonyms of acute intestinal indigestion are simple diarrhea, irritative diarrhea and mechanical diarrhea. The synonyms of chronic intestinal indigestion are chronic diarrhea and chronic irritative diarrhea. The causes of indigestion and diarrhea are the same. We live, not upon what we eat, but upon what we digest.

In a large majority of cases the cause of the indigestion is an excess of proteids in cow's milk, or an excess or diminution of some other constituent. The rate of growth of an animal is an index of the percentage of proteids and mineral matter in the milk. The following table is interesting. (Heuber, *Zeit. f. Diät und Physik. Therapie*, Bd. 3, p. 1, 1899.)

Time by which weight is doubled			Phosphoric		
	in days.	Proteids.	Ash.	Lime.	Acid.
Human ...	180	1.0	0.2	0.032	0.047
Horse	60	2.0	0.4	0.124	0.131
Calf	47	3.5	0.7	0.160	0.197
Goat	19	4.3	0.8	0.210	0.322
Pig	18	5.9	—	—	—
Sheep	10	6.5	.9	0.272	0.412
Cat	9½	7.0	1.0	—	—
Dog	8	7.3	1.3	0.453	0.493
Rabbit	7	10.4	2.4	0.891	0.996

Here we find that a calf doubles its weight in forty-seven days, and the cow's milk contains 3.5 per cent. proteids; whereas, an infant doubles its weight in 180 days, and the woman's milk contains 1 per cent. of proteids. In building up the cells of the body proteids (protos, first) are first in importance, the carbohydrates second, the fats third. We see, therefore, that in cow's milk the most important constituent, proteids, are three times as abundant; and, as we will see later, very much more indigestible than the proteids in woman's milk.

When we consider the rate of growth of a calf and a baby, when we consider the enormous energy that a calf possesses as compared with a baby, and when we consider that a calf will digest grass and various buds, we need not wonder that the food intended for a calf will cause derangement of the digestive tract of an infant. We must remember that a calf is a ruminating animal, a calf will "chew the cud" when a few hours old. The calf, therefore, gets a chance to chew the leathery mass that has been coagulated in the stomach. The infant is not so fortunate as the calf in this respect.

We must further consider that an animal in order to double its weight in a short time must have a powerful stomach, and be provided with rich milk. Such is the case, as shown in the above table. The stomach of a dog is associated with bones, the stomach of a pig will digest almost all raw material. The stomach of a cow digests shrubs, rough weeds and grass. The stomach of a horse is more delicate than that of a cow, and the stomach of a man yet far more delicate. We will now understand the importance of considering the difference between human and cow's

milk. Both woman's and cow's milk contain proteids, carbohydrates, fats, salts and water. Cow's milk is acid, woman's milk is alkaline. The specific gravity is the same. While cow's milk contains 3.5 per cent. proteids the casein (caseous, cheese) forms five-sixths of the total proteids, or 2.9 per cent. In woman's milk the casein forms two-sixths of the 1 per cent. proteids, or 0.3 per cent. The casein of cow's milk is, therefore, nine times as abundant as the casein of woman's milk. The casein of cow's milk belongs to the nuclealbumins. In the manufacture of cheese casein is separated by rennet. Aristotle refers to the renneting of milk with the sap of the fig.

The casein of cow's milk contains phosphorus, is acted on by acids, coagulates when heated, and also by the aid of rennet present in the infant's stomach. As soon as cow's milk is taken into the stomach of an infant, being acted on by rennet, it becomes a solid. The clot of casein shrinks into a tough and leathery mass and offers considerable resistance to the digestive organs. The curd formed in the stomach is denser the greater the proportion of casein and lime salts, and the higher the acidity. Cow's milk contains nine times as much casein and six times as much lime salts as woman's milk, and is acid (Koplik). The curd formed from cow's milk is more bulky, less flocculent, and more disposed to form large clots than that formed from human milk. Paracasein and pseudoneuclein of cow's milk pass through the gut of the infant unabsorbed. The loss in phosphorus is sixteen times as great with cow's milk as with woman's milk (rachitis). Human milk contains in addition to lecithin and nuclein more combined phosphorus than cow's milk.

"Of the total phosphoric acid in human milk 35 per cent. is in the form of lecithin. Of the total phosphoric acid in cow's milk 5 per cent. is in the form of lecithin. Of the total phosphoric acid in human milk 41 per cent. is in the form of phosphocarnic acid. Of the total phosphoric acid in cow's milk 6 per cent. is in the form of phosphocarnic acid." (See Siegfried, *Zeit. f. Physiol. Chem.*, Vol. XXII., p. 575, 1896, and Stoklassa, *Ibid.*, Vol. XXIII., p. 343, 1897.)

In woman's milk the sugar is 7 per cent., in cow's milk the sugar is 4 per cent., both sugars being identical in composition. The fat of both woman's and cow's milk is about 4 per cent. The fat of cow's milk contains large quantities of volatile fatty acids, which exist only in traces in woman's milk.

Cow's milk contains three times as much salts as woman's milk. The inorganic salts of cow's milk, while the same in constituents, have entirely different proportions from that of woman's milk. Cow's milk contains a relatively larger amount of calcium phosphate and a smaller amount of potassium salts and iron oxid. A cow yields as much citric acid in a day as is found in two or three lemons. (Henkel, *Münch. med. Woch.*, No. 19, 1888, p. 328.) It has been mentioned that cow's milk contains six times as much lime salts as human milk. Cow's milk always contains a larger number of bacteria than woman's milk, the latter being practically sterile.

Holt says that excess of proteids in the food of an infant produces curdy stools and diarrhea. Rotch says that an excess of fat will produce vomiting and diarrhea; with a lack of fat we have not enough heat, poor digestion and nutrition and catarrh of the lungs and bowels soon follows. An excess of carbohydrates is productive of fermentation in the stomach and intestines, whereby acids are produced and griping and diarrhea result. A lack of carbohydrates, and the proteids are more difficult to digest, a supply of heat is removed because carbohydrates are partly converted into fat.

Milk varies so enormously that a doctor does not know within 30 per cent. how much nourishment he is giving. The age and breed of the cow, as well as period since calving must be considered.

We come now to another class of diarrheal diseases, indigestion plus infection. "Cholera infantum," says Holt, "is most frequently engrafted on a mild dyspeptic diarrhea." We have acute milk infection, or choleriform diarrhea; peracute milk infection, or summer or infectious diarrhea. Good milk contains 300 bacteria to the drop after milking; when kept at a temperature of 45°F. for 72 hours increases to 150,000 bacteria to the drop. A sample taken from an ill-kept barn contained 2,000 bacteria to the drop when taken, and when kept at 52°F. increased to 16,500,000 in 72 hours. (Experiments in Laboratories of New York Board of Health.) When cow's milk is not kept on ice in transportation from the cow to the home the marvellous increase in bacteria will stagger our mathematical conception. Vaughn, of Ann Arbor, says that acute milk poisoning is produced by a substance more powerful and deadly than white arsenic.

The gastrointestinal mucous membrane is the largest gland

in the body. In an infant, one year old, this gland corresponds to a tube fifteen feet long containing a suitable culture medium. We are frequently presented with the proposition of 20,000,000 bacteria to the drop, or 9,600,000,000 bacteria to the ounce, turned loose to multiply on a gland fifteen feet long. The bacterial flora of the intestine of an infant suffering with milk infection represents a mass of vegetable life far in excess of our imagination.

Cow's milk is not a perfect nor an ideal food, but it is the best we have, and when used in the proper manner is indispensable. In France the experiment to raise infants on asses' milk failed, yet it only needed sweetening, according to science.

Cholera infantum is more closely connected with impure milk than any other form of diarrhea. "One of the greatest stumbling blocks in feeding," says Holt, "is the fact that many robust children in good surroundings have thriven in spite of bad methods of feeding."

Milk should not be over twenty-four hours old and should contain no preservative. Milk should be transported on ice during warm months, or kept at a temperature below 45°F. Cows should never be fed on distillery swill. Considering the filthy udders of cows from resting on dirty ground and the introduction into the milk of foreign matter after drawing, Dr. Backhaus calculated that 300 pounds of excrementitious matter were consumed in Berlin per day. In order to destroy the bacteria in milk, we boil it, or pasteurize it.

Boiling milk, while destroying bacteria does not destroy toxins already formed. It renders the infant liable to scurvy. Some lactose is converted into caramel. The lactalbumin is precipitated and rises to the surface as a scum, taking with it some of the fat and caseinogen. The casein is rendered less coagulable by rennet and appears to be acted upon more slowly by pepsin and trypsin. The organic phosphorus is changed into an inorganic phosphate. Citric acid is partly precipitated as calcium citrate, and some lime salts which are usually soluble are converted into insoluble compounds. Certain changes occur in the fat; certain neutral ferments in fresh milk, believed to be of value in digestion, are destroyed by the heat. The indigestion produced by these changes induce all varieties of diarrhea.

There is no one evidence that points so strongly to cow's milk as a cause of diarrhea as the fact that the only way to save life in a large majority of cases is to withdraw every drop of milk for

a period varying from twenty-four hours to five months. It is almost infanticide to wean an infant during the hot summer months.

Evidently Sydenham had some knowledge of milk infection, for writing in 1670 in his "*Processus Integri*," he says that his manner of curing infantile diarrhea was as follows: "The patient's common drink should be milk boiled with thrice the quantity of water."

Knoepfelmacher and Camerer have shown that there is more waste from cow's milk than breast milk, that the stools of bottle-fed infants are more numerous and of greater bulk than in breast-fed infants. Koplik has shown that the ratio of increase in an infant fed on cow's milk and woman's milk is steadily greater in woman's milk. A frequent error in diet is weaning an infant too rapidly. Eight weeks should often be required to wean an infant.

Condensed milk is simply cow's milk from which a large proportion of water has been removed. As a rule, the milk is reduced to one-third of its original volume, so that all that is necessary to restore it to the original condition is to add twice its volume of water. Very often the cream has been removed by a separator, so that the product is condensed skimmed milk. Sugar is more frequently added as a preservative.

On the market we find,

(1) Unsweetened and condensed whole milk; (2) Sweetened and condensed whole milk; (3) Sweetened and condensed skim milk.

Number (1) when diluted with two parts water represents a good sample of pure cow's milk. The can when opened is apt to ferment and must be treated as fresh meat. Number (2) contains so much sugar that when diluted with two parts water we have 16 per cent. of sugar instead of 4 per cent., as in cow's milk and 7 per cent. in woman's milk. When diluted sixteen times as recommended on the can, we have 3 per cent. sugar, 0.5 per cent. proteids, and less than 1 per cent. fat. Number (3) contains almost no fat, and when diluted in the proportions recommended for infants the resulting fluid is very poor in proteids, and entirely unsuited for babies' nourishment.

Many cases of infantile summer diarrhea are brought about by excess of sugar. Lactose is readily split up by certain microorganisms with the production of lactic acid, a process which oc-

curs in the souring of milk and sometimes in the intestine-producing diarrhea (Huchinson, p. 108, 1903).

There is no doubt that an immense amount of harm is done to infants by the indiscriminate use of such milk. The only kind of condensed milk to be recommended is whole cow's milk without the addition of sugar. A disease of blood and bone follows the use of condensed milk for too long a time.

There is a large class of infant foods on the market. Koplik says of them: "There is no infant food except modified cow's milk which can be utilized as a substitute for the breast with any success." Certain types may be an adjunct to the baby's dietary. All of these foods show deficiency of fat and excess of carbohydrates. We must remember that cereals may successfully tide over an attack of diarrhea. The value of the addition of cereals to milk food can hardly be overestimated.

Mechanical diarrhea is caused by substances taken as a food, which virtually act as a foreign body. Such are: partly cooked rice, oatmeal and other cereals, fresh fruit containing seeds, green corn, radishes, celery, cabbage or other vegetables, nuts and unripe fruit. Peristalsis removes the offending matter.

There is no doubt that the constitutional depression produced by high atmospheric temperature may seriously interfere with digestion, and that sometimes the thirst, which excessive perspiration produces, may lead to the giving of too much food, which may be a cause of indigestion and diarrhea (Holt).

Further evidence of the disadvantage of cow's milk is pointed out by M. Rémy in his *Notes Médicales sur le Japon*, that rachitis is never seen or heard of in Japan where the women have a remarkable abundance of milk, give no food to their children until the first year, and continue to nurse their young until the age of five or six years.

Zweiback, cold bread or crackers taken with cow's milk seem to aid very greatly in its digestion. The coagulation is not as dense, the clots are not as large and the condition is entirely different from the condition in which cow's milk alone is taken as a food. Milk and bread cannot be replaced in an infant dietary.

Ice-cold water is another cause of summer diarrhea. Water is pre-eminently essential, but not iced water. When we consider that the human body is three-fourths water, and one-fourth solid matter, we can conceive the importance of water. The cry of

the modern medical man in the summer is for more water and less food.

The prevention of race suicide, such as exists now in France, consists in decreasing the deaths of infants. Gustave Lejeal, in the *Revue Universalle*, shows that, "of the 850,000 children who are born every year in Paris 148,000 die during the first year, the death rate being 16 per 100." Drs. Budin and Variot have begun to see the solution of race suicide in the establishment of the institutions known as "The Drop of Milk," establishments for the proper feeding of young infants. Before a race considers the problem of increasing the number of births, let it consider the problem of decreasing the number of deaths.

Chronic Nutritional Disturbances in Infants.—Steinitz summarizes (*Jahrb. für Kinderhk.*, Vol. LVII., No. 6) his numerous researches in the assertion that a milk rich in fat causes a loss to the infantile body in fixed alkali. The fat causes more alkali to be used up in the intestines and evacuated in the feces. This entails an increased output of ammonia to compensate this loss of alkalies.—*Journal of the American Medical Association.*

Influence of Hospitals for Contagious Diseases.—F. Farnarier (*Semaine Médical*, August 19, 1903) has made an elaborate study of the deaths in Paris due to certain of the contagious diseases, with special reference to the effect upon the people in the vicinity of hospitals treating such cases. The diseases investigated were measles, scarlatina, whooping-cough, and diphtheria, and particular attention was given to two hospitals in populous wards—the hospital of Enfants-Malades and the hospital Trousseau. As the result of this study, Farnarier states that diphtheria undeniably, and scarlatina probably, radiates from the hospitals where are kept patients suffering from those diseases. The increased death rate in these wards comes from the immediate vicinity of the hospitals. The propriety of removing such hospitals to suburban districts is negated, as it is believed that modern hygienic methods are capable of preventing the spread of infection from them. Among these methods are the use of small isolated pavilions surrounded by trees, and the enclosure of a large "dead space" by the wall around the entire institution.—*American Medicine.*

Obituary.

WALTER S. CHRISTOPHER, M.D.

Dr. Walter S. Christopher, a collaborator of ARCHIVES OF PEDIATRICS, one of the best known and best loved physicians of this country, died on March 2, 1905, at his home in Chicago.

His childhood was spent in Cincinnati, O., where he was educated, graduating from the Medical College of Ohio in 1881. Early in his professional career he was elected demonstrator of chemistry in his *alma mater*, and consulting chemist to the Rookwood Pottery. During his connection with this latter institution he perfected some of the glazes which have since given world-wide fame to the Rookwood ware.

Soon after his graduation he was made clinician to the Children's Clinic of the Medical College of Ohio, which identified him with that department of medicine, the study and teaching of which were to become his life's work.

In 1889 he was made professor of medicine in the University of Michigan. In 1890 he moved to Chicago and was elected professor of pediatrics in the College of Physicians and Surgeons of that city. He was elected a member of the American Pediatric Society in 1889, and was president of this society in 1902.

Dr. Christopher was an enthusiastic pediatrician and contributed to the literature of this branch of medicine many valuable papers. He was especially interested in the intricate and obscure chemical problems associated with nutrition during the early developmental periods and the many contributions from his pen on these subjects will remain as a lasting monument to his memory. Perhaps his most notable contributions are those derived from the "Child-Study" investigations made in the Chicago public schools. This work ranks with the best of its kind that has yet been attempted, and led to the establishment under his direct supervision of a department for "Child-Study" in the Chicago public schools.

During the last ten years of his life, Dr. Christopher devoted his whole time to the study, teaching and practice of pediatrics. He was recognized as the leading pediatricist of the Northwest. His untimely death at the age of forty-six was largely due to his unselfish devotion to his friends and to his profession, which he loved better than he did himself.



WALTER S. CHRISTOPHER, M.D.

ARCHIVES OF PEDIATRICS.

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CEREBROSPINAL MENINGITIS.

The prevalence of an epidemic of cerebrospinal meningitis in New York, and the apparent futility of treatment in lessening mortality, has led the Department of Health to appoint a special commission of physicians to consider means by which the disease may be brought under control and successfully combatted.

Long before the diplococcus of Weichselbaum (diplococcus intracellularis meningitidis) was described, the epidemic and infectious character of cerebrospinal meningitis was understood and the importance of hygienic and sanitary surroundings in lessen-

ing its spread was recognized. The association of the disease in connection with stables and stable refuse, bad drainage, dampness, and such epidemic influences as influenza and pneumonia, had been studied, and health officers had put in force rules which required physicians having meningitis cases under their charge to report them. Beyond, however, a rather perfunctory survey of premises where cases of the disease had occurred, nothing was done except the tabulation of statistics of morbidity and mortality. The mortality of cerebrospinal meningitis given in the monthly bulletin of the New York State Department of Health for January, 1905, was 149 for the whole state. Of these deaths 123 were in New York City (all boroughs), where the mortality from diarrheal diseases in children under five years of age was 139, and from croup and diphtheria 191. Cerebrospinal meningitis was the third in the mortality tables of the recorded epidemic diseases. What steps will be taken by the Commission appointed by the Department of Health to stop the spread of meningitis cannot be foretold, but definite and concerted action will no doubt elevate the prophylaxis and treatment of this disease to a higher plane, and show at their true value the claims of physicians who, after apparent success achieved with a few cases, gain a transient notoriety by their advocacy of treatment which in a few weeks has a place only in the limbo of the past.

The high mortality of cerebrospinal fever has led pathologists and clinicians to look to lumbar puncture not only for the determination of the bacteriology of the disease, but also as a method by which cerebrospinal pressure might be relieved and therapeutic measures instituted. The first success seemed to come after lumbar puncture had been done for purposes of cytodagnosis, and where pressure symptoms indicated that some depletion of the contents of the arachnoid space might lessen the nervous phenomena of the disease. Huber, however, after an extensive experience, stated (*ARCHIVES OF PEDIATRICS*, February, 1905) that he agreed with Jacobi, who wrote that lumbar punc-

ture might relieve symptoms of congestion, pressure, edema and coma, but it rarely aided in accomplishing a cure. If lumbar puncture has a special value, it is without doubt early in the course of meningitis.

Trephining has been done for hydrocephalus with symptomatic relief in many cases. Acting on the belief that the meningococcus causes pressure by exudation and an increase of fluid, the operation is at present being tried for cerebrospinal meningitis. Whether with better results than those given by lumbar puncture we cannot now state.

A disease so serious as meningitis has urged for its treatment methods that attempt to abort or destroy the activity of bacteria that cause it. Such a plan of treatment is the injection into the spinal canal of antiseptic solutions. Lysol has been a favorite, but the experiences with it at city institutions, where a large number of children have been under treatment, do not show any realization of the claims of the suggestors.

Recently Wolff, of Hartford, Conn., stated that he found an antagonism existing between the bacillus of diphtheria and the diplococcus of Weichselbaum. Accepting the experience of Wolff, with 4 successful cases, Waitzfelder instituted the treatment of meningitis at Gouverneur Hospital by injecting diphtheria antitoxin. These observations he reported in the *Medical Record* of March 11, 1905. In all 17 cases were treated, with the following results:—5 patients recovered completely, 3 died, and 9 were under observation at the date of the report. Of these, 4 were in serious condition. As Dr. Waitzfelder's hospital term ended on March 1st, he acknowledged that this mortality rate may be higher after a lapse of time and after the patients have passed from under his observation. The same treatment was carried out at both the Presbyterian and the New York Hospitals without influencing the symptoms of meningitis as claimed by Waitzfelder. A doubling of the leukocytes in the general circulation was observed, but the importance of this has not been determined. To unbiased ob-

servers Wolff and Waitzfelder have not substantiated their treatment.

In the same category may be placed the intradural injection of diphtheria antitoxin, which aroused some enthusiasm when it was first employed. We are, then, in the unfortunate position where we know the cause of cerebrospinal meningitis but we are not able to advance a specific treatment. If the Commission acting under the Department of Health can, by a study of comparative diseases, suggest anything that will lower, even in a small degree, the mortality of meningitis, it will confer a vast benefit, not only upon the community but upon the world.

THE PHILADELPHIA PEDIATRIC SOCIETY.

The proceedings of the Philadelphia Pediatric Society are furnished exclusively to ARCHIVES OF PEDIATRICS by agreement with the Society. The arrangement is of mutual benefit to the members of the Society and to the readers of ARCHIVES, the former of whom gain by the wide circulation of their papers and discussions, and the latter by the opportunity given them to keep in touch with the scientific work of one of the most active special societies in this country.

The appearance of what purport to be transactions of the Philadelphia Pediatric Society in other medical publications, without acknowledgment to ARCHIVES, and without permission from the publishers, is distinctly a piracy.

In view of the trouble and expense taken by the publishers of ARCHIVES to present to their readers contributions which have not only the merit of originality but also of honesty, it is matter of regret that any medical journal should appropriate to itself reports which are claimed as original after a few alterations from the text as printed in ARCHIVES OF PEDIATRICS.

Bibliography.

The International Medical Annual: A Year Book of Treatment and Practitioners' Index. By thirty-six contributors. 1905. Twenty-third year. Pp. ix.-644. Illustrated. New York: E. B. Treat & Co. Price, \$3.00.

The present issue of the Medical Annual appears with a larger and more symmetrical page than formerly, so that the impression on opening the volume is most favorable. A closer scrutiny of the contents of the book bears out the first glance, as the subjects are well placed and the introductory section on *Materia Medica* is a comprehensive arrangement of the newer drugs with brief paragraphs descriptive of their use. There is not a new drug that is omitted from this opening section and a few minutes' perusal will give the reader the status of many articles of which he knows only the names.

Still's review of the diseases of infancy and childhood is made with the analytical care he always shows in studying current literature. He well states that insufficient dilution of cow's milk is one of the most frequent causes of digestive troubles in an infant, and there is, therefore, sometimes a tendency to run to the opposite extreme and use mixtures in which the infant gets only 0.5 per cent., or even less, of proteid.

Goodall is sceptical of the importance ascribed by some observers to the protozoon-like bodies found in scarlet fever. He believes that the specific organism of this disease, if it is to be found anywhere, will be in the nasal discharge that is so frequently present, not only in the acute stage, but also during convalescence and for some time afterward.

The list of American editors has been augmented since the previous issue, and the Medical Annual for this year, as in previous issues, is the most compact of the yearly digests and the best for ready reference. The large number of half-tone illustrations which are clearly printed elucidate surgical and medical topics. The book deserves its success because of its practical character and justifies the encomiums of its readers.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, February 9, 1905.

L. E. LA FÉTRA, M.D., CHAIRMAN.

A CASE OF ENLARGED SPLEEN WITH REPORT OF BLOOD CHANGES.

DR. ELI LONG, JR., presented this case. A negro girl, eleven years of age, had come under observation one year ago. He felt justified in presenting her on account of the appearance of the blood at that time, which indicated a pseudoleukemia infantum, notwithstanding the age of the patient and the changed state of the blood at present. Her family history was negative; two brothers and an older sister were healthy, except for the manifestations of rickets. At the age of one year the patient had bronchitis and at the age of three pneumonia, since which time she had had occasional epistaxis. She had had measles and an indefinite history of malaria. One year ago she began to complain of pain in the stomach, especially severe after eating. Physical examination revealed nothing wrong except an enlarged spleen, though her color seemed rather lighter than normal. The anterior border of the spleen reached to the umbilicus. The organ was hard and almost nodular. The liver was somewhat enlarged. A provisional diagnosis was made one year ago of pseudoleukemia infantum, but now the blood no longer shows this condition.

DR. L. B. GOLDHORN said that, while there appeared to be nothing extraordinary in this case clinically, blood examinations made during the year had been very interesting. A year ago there were 2,500,000 red cells; hemoglobin 42 per cent. with a color index of 0.8; the white count was 18,400. There was a moderate number of eosinophiles and a very large number of myelocytes. There was a large number of nucleated red cells and the red cells showed much poikilocytosis of a peculiar nature, a

peculiarly elongated sausage-like corpuscle forming an unusual and characteristic element. The appearance of the blood was that of a pseudoleukemia infantum (anemia infantum pseudoleukemia of von Jaksch). Recent examination of the blood showed 3,100,000 red cells; 43 per cent. hemoglobin with a color index of 0.7; about 16,000 leukocytes. In testing coagulability he found that fibrin formation commenced after two and one-half minutes at 72°; that is, there was an increase in coagulability over that of normal blood. Eosinophiles were then practically absent as were also myelocytes. There was a polymorphonuclear count of 72 per cent., of lymphocytes 26 per cent., of mononuclears and transitional forms of Ehrlich 2 per cent. Malarial parasites were never found in this case. The peculiar sausage-shaped corpuscles still formed the distinguishing feature. Macrocytes were seen in abundance, but all showed central pallor. No megaloblasts were found. For a secondary anemia the blood showed unusually many pessary forms and macrocytes, having thus some of the characteristics of pernicious anemia and of chlorosis.

DR. HENRY HEIMAN said that, from a study of the blood, he would conclude it to be probably a case of splenic-myelogenous leukemia; in the chronic leukemias it was well known that the blood would present all kinds of changes, consequently numerous blood examinations, especially differential counts of the white cells will be necessary, before a positive diagnosis could be made.

DR. GOLDHORN said that the possibility of the case being one of splenic-myelogenous leukemia was out of the question. He believed that he had conveyed a mistaken idea regarding the percentage of myelocytes; they were not more than 2, 3 or 4 per cent. in the blood as seen a year ago. Moreover, the mast-cells, the most characteristic cells of a myelogenous leukemia, were almost absent.

A CASE OF SYPHILITIC PSEUDOPARALYSIS.

DR. JACOB SOBEL presented this report. He said that the osseous changes common to hereditary syphilis were most frequently manifested in the form of a diaphyseal-epiphyseal lesion, that is, an osteochondritis of the femur, humerus, tibia, radius or ulna. This manifestation, when associated with other signs of congenital lues admitted, as a rule, of ready diagnosis, but when present as an initial symptom, so to say, it rendered a diagnosis not only

very difficult, but at times impossible for some period. The following was a case in point:—Helen Z., age three weeks, bottle-fed since birth, was brought to his dispensary service at Lebanon Hospital on December 1, 1904, with the history that for the past four days the child did not seem able to move its left arm. The child was apparently well until four days preceding, when some friends who were visiting played with her and pulled the arm, as the guardian thought. The patient was the first born child, the labor was normal, and, so far as the guardian knew, the parents were healthy. At the first visit the speaker and his associate paid particular attention to the examination of the left upper extremity, examining carefully the clavicle, shoulder, elbow, wrist and hand; no subluxation was found, no fracture, no dislocation and no swelling of any kind. There was, however, a drop wrist with its characteristic deformity and disability. Tickling of the palm caused slight movement of the fingers. No callus pressing on the musculospiral nerve could be detected, nor was there pain on pressure over any of the joints. In addition to the drop-wrist, there was a slight inward rotation of the arm suggesting the upper arm type of birth paralysis, but the fact that the condition had appeared during the third week of life and that there was no atrophy ruled out Erb's paralysis. A physical examination of the patient at this time was absolutely negative, not even a palpable liver or spleen. A tentative diagnosis of traumatic neuritis was then made, and gentle massage with cocoa butter and rest were ordered. The guardian returned on two subsequent occasions, two or three days apart, to report some improvement, at both times. Examination of the extremity, and especially of the wrist joint, revealed nothing except some slight pain on passive movement. All other joints were free and painless and the gums were normal. There were no evidences of rickets. On December 10th there was detected a distinct crepitation at the lower end of the radius and ulna, at the junction of the epiphysis and diaphysis—an epiphyseal separation. The case was then transferred to the surgical service. One week later the face was covered partially with a papulo-pustular eruption, with adherent crusts here and there, especially around the mouth; the crusts resembled those of impetigo contagiosa, but were easily differentiated by their copper-colored base; the body showed a maculopapular, ham-colored eruption and the skin of the soles and palms

was desquamating and thickened; there were decided coryza, snuffles, mouth breathing, fissured lips; in a word, the clinical picture of congenital lues. The spleen and liver at this time were distinctly palpable. Then the diagnosis of the original condition became clear and the cause of the pseudoparalysis was evident. Subsequently distinct anal condylomata made their appearance. The forearm was immobilized with lateral splints and the lues was treated in the dermatological service of the hospital by the administration of calomel, $\frac{1}{20}$ to $\frac{1}{10}$ grain doses three times daily, and by the twice daily application to the umbilical region of a pea-sized piece of white precipitate ointment covered with a flannel abdominal band. In three and a half weeks no false point of motion or crepitation was detected and in four and a half weeks the surgical aspect of the case was closed. Under the anti-specific treatment rapid improvement was made.

It seemed that the sequence of events in this case—pseudoparalysis (epiphysitis), epiphyseal separation, and, lastly, the cutaneous outbreak—was interesting and instructive and warned us to be on our guard in diagnosing monarticular involvements in young children. He said that when brought face to face with a similar case in the future, after excluding trauma, fracture, sepsis, perhaps infantile scurvy, it might be well to turn our thoughts to the possibility of syphilitic osteochondritis.

DR. HERRMAN said it was remarkable that the child presented had shown no symptoms of syphilis, not even snuffles. He thought the case was of special interest from a differential diagnostic standpoint, on account of the history of traumatism. There was a condition in which a pseudoparalysis might result from traumatism, the painful paralysis of infants of the French. The cases of syphilitic pseudoparalysis usually affected the upper extremities and not the lower, and this was supposed to be because of the attachment of the tendons of important muscles near the epiphyses in the upper extremity, which was not the case in the lower extremity.

DR. L. E. LA FÉTRA said that, during the past year, he had seen 2 cases of syphilitic pseudoparalysis. In one an epiphyseal separation at both wrists had been allowed to go on untreated until the bones had assumed a very faulty position, the deformity being a forward deviation of the epiphyses so that the wrists were at right angles to the forearm. In the other case not only were

the upper extremities involved, but the lower as well. The trouble began in the upper extremity. Pseudoparalysis or paralysis in infants should always suggest scurvy and congenital syphilis as well as organic brain and nerve lesions.

A CASE OF VISCERAL SYPHILIS IN A BOY WITH HEREDO-SYPHILIS
TARDA.

DR. SARA WELT-KAKELS presented a boy, nine and a half years old, who was the youngest of five children. The four older children were all healthy. The father was said to have contracted lues two years prior to the birth of the patient. The child was born not quite at full term, was very small and had to be wrapped in cotton for the first two weeks of his life. He also lost much blood through the slipping of the cord ligature. Soon he began to suffer from snuffles. When six months old there appeared a swelling of the bones around the right elbow joint, which was supposed to be due to rachitis. There was also an umbilical and two inguinal hernias. When he was one year old he had a luxation of the right shoulder. When two years old he had an attack of measles with complicating pneumonia and croup. In his fourth year he suffered from paronychia on the right great toe, which required a few months to cure. When six years old he began to suffer from an interstitial keratitis in both eyes for which he was treated for more than a year. He was brought to Dr. Welt-Kakels for treatment for enlarged lymph nodes of the neck two years ago. The patient suffered last summer from bronchitis; he never had eruptions on the skin. Five weeks ago he complained of abdominal pain, had no appetite, was constipated, and tired easily. The boy was found to be badly nourished, weighed 36 pounds, rather undersized for his age, skin pale and sallow, no icterus, upper median incisors notched, slight enlargement of the cervical, inguinal and epitrochlear glands. There was a slight systolic murmur, most likely anemic in origin. The abdomen was considerably enlarged, the abdominal veins, particularly on the right, much dilated, with slight dullness in the lateral portions of the lower half of the abdomen, and a wave of fluctuation could be obtained. The liver was very large, mainly the left lobe, and was not sensitive on pressure, rather hard and resistant on touch, the upper border being in the right mammary line at the fifth rib, the lower margin of the right

lobe ending about two inches below the free border of the ribs, while the lower edge of the left lobe was distinctly palpable some distance below the umbilicus. The extent of liver dullness over the left lobe was five and a half inches. The spleen was much enlarged and its dullness joined the hepatic dullness; it extended about 3 inches below the free border of the ribs, was not sensitive and gave a feeling of resistance; its surface was smooth. The urine was normal. The red cell count was 4,480,000; white cells, 11,000; hemoglobin only 30 per cent. Nothing abnormal was found in the differential white count.

DR. THOMAS S. SOUTHWORTH read a paper on

THE DIGESTION OF CASEINS AND ITS RELATION TO CERTAIN
PROBLEMS IN INFANT FEEDING.

Despite advances in technique and a better understanding of clinical indications, our methods of infant feeding have thus far rested chiefly upon empirical bases, because of lack of progress in elucidating the complex problems of digestion. The milks of all species of mammals contain fat and sugar which furnish heat and energy, while the nitrogen-containing proteids serve to build the body, make blood, repair waste and form new cells. The proteids consist of casein, which is precipitated during digestion, and a group of soluble albuminous bodies which are absorbed without precipitation. The quantity of proteid in different mammalian milks varies with the rapidity of the growth of the young, and the length of time in which they become independent of the maternal milk. The physical characteristics of the casein curds formed in digestion are adapted to the species and its type of digestive organs. The caseins of different milks are probably not the same; they certainly are not interchangeable with equal digestibility for the stomachs of the young of different species. Van Slyke and Hart, at the New York Agricultural Experiment Station, Geneva, N. Y., have made important discoveries in their investigations of cheese making which can be applied to the physiology of infant digestion. The casein of cow's milk is in the form of calcium casein. Rennet, secreted by the stomach, transforms this into a soft clot called calcium paracasein. Unless some acid is present this cannot be digested by pepsin in the stomach, but can be passed on and digested in the intestine. A small amount of acid removes the calcium from a part of the

calcium paracasein and leaves free paracasein. A larger amount of acid combines with the free paracasein, and when the acid is the hydrochloric acid of the stomach, a hydrochlorid of paracasein is formed. Both free paracasein and hydrochlorid of paracasein are firmer curds with a tendency to shrink. There is not only normally a nice balance between the amount of curd formed and the pepsin present to digest it, but as the amount of gastric secretion increases the amount and kind of curd formed enlarges the task of stomach digestion, prolonging its duration and fitting the stomach to eventually digest the solid food of adult life. Not only does cow's milk form curds in the infant's stomach, which are more difficult to digest than those of breast milk, but the lactic acid which is formed by bacterial action in cow's milk may increase the amount and kind of curd formed with rennet and acid in the stomach beyond its powers of peptic digestion. When, however, milk is sour enough to curdle, the lactic acid has already acted on the calcium casein of the milk and formed curds of free casein and lactate of casein. These are softer and more digestible than similar forms of paracasein, and since rennet does not act upon them to change them into the tougher paracasein curds, fully soured milk and buttermilk are more digestible. Allowing an infant's milk, either before or after modification, to remain at a temperature which favors the production of lactic acid short of the point at which curdling gives a visible souring, is dangerous. Peptonization has an indirect influence upon the digestibility of casein, because by destroying the lactic-acid-producing bacteria additional acid is not introduced into the stomach. Reference was made to the author's paper in the February issue of the ARCHIVES OF PEDIATRICS, in which it was shown that alkaline antacids, lime-water and bicarbonate of soda, influenced the digestion of casein because in an alkaline reaction the rennet ferment is retarded or inhibited and acids present are neutralized so that clotting or curdling of the milk is prevented or delayed, allowing of the escape into and digestion in the intestine of a part of the fluid milk. Peptonization, or, better, "pancreatization," converts more or less of the casein into non-coagulable forms and the sodium bicarbonate in the preparation used has the effects just mentioned of an alkaline antacid. The occasional cases of somewhat older infants where curded or undigested stools give way to well-digested movements when a much diluted milk is replaced

by a stronger or more concentrated feeding, may be explained by the assumption that the change allows the acid secreted by the stomach to combine with a larger amount of casein, forming the more digestible free paracasein instead of the tougher hydrochlorid of paracasein. The greater stimulus given to gastric digestion by a more concentrated food must also be taken into consideration. True, rounded, tough curds passed in an infant's stools indicate rapid curding into large masses in the stomach in the presence of over-abundant acid. This may result from the hydrochloric acid secretion of the stomach, or the presence, also, of lactic acid in the milk or other acids formed in the stomach contents during tardy digestion. To prevent such curds may require cleaner milk kept properly cool, pasteurization, the use of alkaline antacids, cereal diluents, peptonization or, perhaps; either a decrease or even occasionally an increase in the strength of the milk formula. Where there is difficulty in securing the digestion of cow's milk there is much in successful infant feeding beside dilution of milk or top milk and the addition of sugar. The newer chemistry of milk explains many things which have been obscure, and the chief advances in the future will probably be along the lines of the chemistry and physiology of digestion.

DR. HENRY DWIGHT CHAPIN said that the paper read represented the firstfruits along the lines he had been working during the past three years. The work of pediatricians in the direction of fine percentages had about reached its limit. All would recognize the fact that percentage feeding was an important advance in the feeding of infants, inasmuch as it gave an idea of the nutritive value of foods. Some time ago it seemed to him that the value of percentage feeding rested principally in a knowledge of food values and he confessed that his studies then took the direction of careful investigations of all the aspects of the biological properties of milk, especially cow's milk. He found that the more recent and the best work on the study of milk had been done by the Department of Agriculture and that the immense amount of work done there could be directly applied to the infant feeding question. The distinction between the rennet and acid curds of casein of milk had a practical application in the problems of infant feeding. He said we should know more about the proteid of milk, where it was best digested, and how it could be best prepared for digestion; also, what the varying conditions were

which aided its digestion in different portions of the digestive tract. His studies led him up to the belief that the proteid of milks had other functions than those of mere nutrition; that it was developmental as well. The proteid of milks had the particular property of developing the digestive tract along the line of its future work. He said that one should never expect to obtain milk from a cow and make it like mother's milk. Of course one may try to make cow's milk as nearly as possible similar in composition to mother's milk, as the section had just heard from Dr. Southworth, but the adding of alkali to cow's milk was not to make it like human milk, but to throw it from the stomach into the intestine in a fluid condition which was not natural. There was a limitation to these chemical manipulations of the food, which he had shown in a paper on "The Limitations of Chemistry in Infant Feeding" read at a previous meeting of the section.

DR. WALTER LESTER CARR said that he thought all accepted the fact that cow's milk was the best for the infant when artificial feeding became necessary, because it could be most easily procured and adapted. The difficulty has been that the chemical composition of cow's milk has been regarded as the important thing and it has been adjusted to conform to human milk with some indistinct idea that because the chemistry was approximated the assimilability of cow's milk was the same as breast milk. In analyses of mother's milk it was surprising how comparatively slight the differences of percentages were when an infant seemed greatly disturbed. Working with modified cow's milk it was often difficult to get percentages showing such fine fractions. In the course of a disease, as influenza, pneumonia, etc., it might be necessary to cut the proteid and fat percentage far below what would be regarded as the usual standard for the infant if fed at the breast. In other words, the infant could not digest cow's milk modified to the chemical formula of human milk when its digestive power was impaired and an infant might be uncomfortable at the breast, when the milk supplied had undergone a slight change that chemistry did not fully detect, without the influence of disease as a factor of imperfect assimilation. In artificial feeding physicians frequently force a proteid percentage on an infant because of the fact that most infants should have that percentage and not because all infants could digest it. The nutritional condition of the infant should not be lost sight of. An

infant requires certain percentage of fat; also of proteids; but the proteids were at times overcrowded, as were the fat, and the infant's digestion was injured. The question was not so much whether the percentage conformed to the average percentage to be given the infant of a certain age, but whether the percentage was one which brought the infant up to the best point of development—whether the infant had a muscular and nutritional development equal to its growth.

DR. FLOYD M. CRANDALL said that the difficulty encountered in properly feeding infants artificially was so great that any light thrown upon the subject was certainly to be desired, and many points had been brought out to explain the difficulties encountered in the empirical work of infant feeding. It seemed to him that the general practitioner was inclined to feed too large percentages, especially of the proteids; while, on the other hand, the specialist made them too weak. What had been said regarding the saturation of the curd by the addition of acid was interesting to him, as it tended to explain the difficulties encountered in a number of cases; children seemed to do better upon stronger than upon the weaker mixtures. He had often felt afraid to try these stronger mixtures and kept the children on the weaker mixtures longer than he should. Often a child on diluted casein would pass a very tough curd. He had recently seen a child that did this and he found that it took the milk rapidly through a nipple with a very large orifice and not enough time was taken in feeding; as a result, the curd was precipitated in a single mass. By increasing the time taken in feeding this was corrected. He referred to the importance of casein in a child's diet; it is the building element and, therefore, is most important.

DR. CHAS. G. KERLEY said that the discussion related particularly to the chemistry and physiology of the infant's digestion and to the preparation of the milk which was to be used for the infant's nourishment. He felt that this did not cover the question of the digestion of proteids, however, and that more attention should be paid to the food receptacle and the condition of the child. Equally important as the milk manipulation, the addition of cereals or peptonizing, or the addition of alkalies, was to get at the baby and learn what was wrong with it. It should be our effort to make the baby come up to the milk, and not to limit our work to the attempt to make the milk come up to the baby.

In cases of early malnutrition he had often found that the daily washing of the infant's stomach was of great value. What was needed for proteid digestion was a good proteid digestive capacity, and the daily stomach washing was one of the best means of attaining this end. He was often surprised to find how much mucus and undigested material could be washed out of this organ, which had not expelled its contents by vomiting—not even once. The general management of the child was very important. It should be kept out of doors a good part of the day to ensure it plenty of fresh air. Prolonged indoor airing should be given on inclement days. Salt baths, massage and inunctions of oil are very important aids in many cases.

DR. G. R. PISEK said that the introduction of alkalies into the food for babies was of special interest to him. The persistent use of alkalies would result in neutralizing the acid present in the stomach, and if we started out with the presumption that the milk used was wholesome, it would be unnecessary, as there would be no acid to neutralize.

If we could break up the curd by this addition that would be serviceable, but what was usually done was an expulsion of the curd into the intestines, and the stomach then barely served as a reservoir and this was not sufficient for the requirements or needs of the stomach. If one added bicarbonate of soda, $2\frac{1}{2}$ grains to the ounce of milk, one would be giving two and a half times as much as would be necessary to neutralize the milk, if it was absolutely sour.

DR. EDWARD F. BRUSH, of Mt. Vernon, believed that much honest work was done along the lines of infant feeding, but he also believed that they were wrong lines if good results were to be obtained. He said that most men spoke of the chemistry of milk as they would speak of 90 per cent. alcohol, as though it was always the same. In milk this was not so. Sometimes the casein would drop down during thunder storms, or because of a jolt, and he believed that the age of the milk had something to do with it. He did not think that the consideration of the chemistry of milk or the methods of examining it in New York City amounted to much. Years ago the lactometer was used; then the farmers would stop just outside the city limits and raise the specific gravity of the milk by the addition of burnt sugar, etc. If the percentage of fat was too high, that gave them a chance to add

water. If the germs were present in numbers, the farmer, with the centrifugal machine, used slowly, could rid the milk of them. Milk to be good should be milk less than twenty-four hours old. Milk often was like the blood; the blood retained its vitality until it coagulated; the same with milk. With regard to the value of the work done by the Department of Agriculture, it should be remembered that it was trying to devise means for enriching the farmer and every refuse matter from factories, distilleries and the like was being used to feed the cattle and, therefore, he did not believe much benefit was being derived from a study of its work in infant feeding. What was of the greatest value today in New York City was the work done in visitation of the dairies. If those present could visit with him some of the dairy farms they would not be surprised at their many failures in attempts to modify the milk. But if the Board of Health would continue their good work of inspection of these dairies, making the farmer keep his place clean and keep preservatives out of the milk, much good would be done and so many attempts at modification would not be required.

DR. ELIAS H. BARTLEY, of Brooklyn, said the removal of the calcium salts from the milk would permit the milk to pass through the stomach without coagulating, if there were no calcium salts in the stomach. How to do this he was trying to solve. Of course, certain substances could now be added, such as Glauber's salt for instance, which would prevent this coagulability, but they would be harmful to the child.

DR. THOMAS S. SOUTHWORTH said that while he regretted that it had become necessary to introduce new chemical terms, a recognition of the physical changes taking place in milk during digestion was what he chiefly desired to emphasize as the most practical side of the question. Dr. Crandall's success in infant feeding was probably because he gave the weaker mixtures first and got the child's digestion in good order, and then he was able to give the stronger mixtures. He agreed with Dr. Kerley that a child to have a good digestion should be brought to the best physical condition possible. When the stomach was washed out one got rid of decomposing materials, the remains of previous meals, and with them the bacteria and certain acids which tended to form quickly tough acid curds.

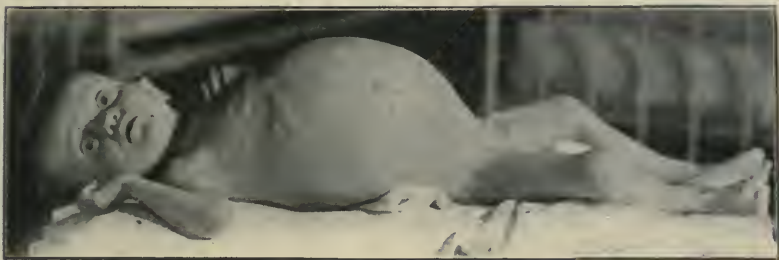
THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, January 10, 1905.

DR. JOHN H. JOPSON, PRESIDENT.

CASE OF EXTREME INTESTINAL ATONY.

DR. D. J. MILTON MILLER exhibited the patient, a child of twenty-eight months. The patient had been on the programme for December, as a case of possible abdominal tuberculosis, but further observation had caused a revision of the diagnosis. The child, now twenty-nine months old, was well until its tenth month, when it was weaned and fed upon condensed milk and other proprietary foods. At fourteen months it was separated from its mother and placed in a baby farm, where it remained several



EXTREME INTESTINAL ATONY; PATIENT TWO YEARS AND
THREE MONTHS OLD.

months. The mother then claimed it again, and noticed for the first time the abdominal distension and that the mental condition was impaired, whereas formerly it had been as bright as most children of its age; this she attributed to dosing with paregoric, while the little patient was in the farm. Sometime after this it was sent to Atlantic City, and thence to St. Christopher's Hospital, from which place it entered Dr. Miller's service at the Children's Hospital. During these many months it had had almost constant diarrhea, and had been fed most improperly. The child showed distinct signs of rickets, particularly beading of the ribs, square head and patent fontanel; the extremities were quite emaciated, but its most conspicuous feature was the enormously distended abdomen. This measured 22 inches at the navel, and 23 inches midway between the latter and the ensiform cartilage. That the distension was largely intestinal was shown by the failure to out-

line the stomach when it was filled with water; and that the colon, at least, was dilated by its ability to retain for 20 minutes a quart of fluid. Over the distended abdomen the superficial veins were well-marked, but it could never be determined that they joined with those of the thorax. Neither liver nor spleen could be palpated, nor could enlarged glands nor masses of any kind be discovered in the abdomen. The distension was almost entirely due to flatus, of which the child constantly passed large quantities; fluid had never been detected. The temperature had been constantly above normal (99° - 100° F., or 101° F.), and there was a secondary anemia (red blood cells, 5,532,000; white cells, 11,000; hemoglobin, 65 per cent.). The urine contained a trace of albumin, and from time to time a few hyaline and granular casts. Because of the possibility of abdominal tuberculosis (mesenteric lymph nodes or peritoneum) $\frac{1}{10}$ mgm. of tuberculin was given by injection on two occasions. Prompt reactions followed; at one time the temperature rose to 103.5° F., at the second to 102° F. This gave rise to the diagnosis of possible intestinal or mesenteric tuberculosis; but, as already stated, this opinion had been altered, and was not warranted simply because the reaction was present; it might have been caused by a tuberculous focus elsewhere, the bronchial lymph nodes, for instance, which might well be implicated, as there had been long standing bronchial catarrh. For the same reason tuberculosis of the mesenteric glands could not be absolutely excluded; for, although they did not appear to be enlarged, the chronic intestinal catarrh would render them liable to infection. It seemed very unlikely that the enteritis was tuberculous, the clinical history and signs being quite opposed to such an idea. At one time, the question of congenital dilatation of the colon had been considered; but was dismissed, because the abdomen appeared to have been natural until after weaning at the tenth month, and, although the congenital affection may not reveal itself until later infancy, yet the entire absence of a history of constipation in the patient would seem to exclude that condition. Dr. Miller was inclined, consequently, to regard the case as one of extreme intestinal atony due to rickets and long standing intestinal catarrh, although abdominal tuberculosis could not be positively barred out. The patient's mental condition was interesting; it was far behind healthy children of equal age; it could not talk, and did not seem to recognize its attendants, although long familiar with their presence; it would lie upon its back the live-

long day playing with its feet or hands, and had a peculiar, almost athetoid, way of moving the fingers about. Whether this condition was due to long-continued mal-nutrition, or to actual arrest of cerebral development, could not be determined. The child had greatly improved while in the hospital, and had gained in two months about 6 pounds. The treatment had consisted of abdominal massage with guaiacol ointment, hypodermic injections of strychninæ (gr.-100 daily), and careful feeding. For a month past it had been under Dr. Griffith's care.

J. P. CROZER GRIFFITH agreed with Dr. Miller as to the diagnosis. The only other probable condition was idiopathic dilatation of the colon, and in a study of the literature of this disease Dr. Griffith had noted that practically all cases have marked constipation, perhaps interrupted by occasional attacks of diarrhea. The presence of persistent diarrhea in this case makes dilatation seem improbable.

DR. MILLER asked Dr. Edsall what he considered to be the significance of the tuberculin reaction.

DR. EDSALL replied that his personal experience has been rather slight, but from the literature it seems highly probable that the child has some focus of tuberculosis, though there is an appreciable percentage of error in this method of diagnosis.

DR. MILLER had asked the question because of the patient's prompt reaction to two separate injections of tuberculin, which he thought was strong proof of tuberculosis somewhere, possibly of the bronchial or mesenteric glands, as it had suffered for a long period from two conditions liable to give rise to infection of lymph nodes, viz., bronchial and intestinal catarrh.

DR. J. P. CROZER GRIFFITH reported a case of

CONGENITAL STENOSIS OF THE COMMON BILE DUCT.

The paper will be found in full on page 257 of this number of ARCHIVES OF PEDIATRICS.

DR. LA ROQUE said that he had made the autopsy and upon opening the abdominal cavity found the gall bladder enlarged and the intestine in this region deeply stained with bile, while the intestinal contents and mucous membrane were not so colored. After a search over the surface of the duodenum the papilla was found, but the biliary canal was not patulous from the intestinal

end. Bile could not be forced through the lower end of the common duct and a fine straw could not be passed through from above nor below. For a short distance near the papilla, the common duct seemed to be merely a fibrous cord. The cystic and hepatic ducts were patulous.

DR. HAMILL asked whether the autopsy reports show varying degrees of obstruction. It is difficult to see how cases of complete obstruction could live for any length of time. In a series of cases of sepsis in the newborn that he had studied, there was usually diarrhea with greenish stools, fever, extensive hemorrhages from the mucous membranes and often jaundice of varying degree. In the cases with jaundice he had found no obstruction of the biliary duct at autopsy.

DR. HAND, in reference to the question whether the stenosis or the biliary cirrhosis is the primary condition, described a case that he saw at autopsy several years ago in a child that died at seven months after having had an increasing degree of jaundice and ascites. He found a very marked biliary cirrhosis with stenosis of the ducts. The latter was evidently the primary condition and the cirrhosis was due to it.

DR. D. J. MILTON MILLER asked whether the literature shows that fever occurs in congenital stenosis of the ducts. If so, it must be extremely difficult to distinguish this condition from septic cases. He mentioned as an instance of the latter a child removed by Caesarean section that had rapidly developed purpura, hemorrhages, jaundice, high fever and soon died.

DR. J. P. CROZER GRIFFITH said that fever is not a symptom in obstruction. If the child lives long enough ascites may develop as a result of the liver becoming atrophic. This, however, is unusual. Seven months is a long time for the condition to last, but it has been known to last as long as eight months. Complete obstruction must, of course, be fatal; and in such a case the obstruction may be very localized, or may extend over a large part of the ducts, and the gall bladder has even been entirely absent. In some cases, however, it is highly probable that the obstruction is not complete at first, and its effects are but slight at first, and that they ultimately grow worse and finally cause death. There are cases unusual in which obstruction has taken place after several years, due possibly to a recurrence of a cholangitis which developed originally in fetal life, but which for some reason has not advanced to a

condition of complete obliteration. We have no knowledge how often this occurs.

DR. HOWARD CHILDS CARPENTER reported

A CASE OF LATERAL CURVATURE IN AN INFANT ELEVEN MONTHS
OLD.

The family history was entirely negative, with the exception that the mother has had four miscarriages, and three premature births. This child was born at term in an easy labor, lasting one hour. It had no deformity at birth. It was fed exclusively on the breast until six months old, since then, besides the breast, milk and crackers, meat broth and mashed potatoes. It has *never* been sick with one exception: an attack of enteritis when six months old. The mother denies all history of traumatism. She carries the child as much on one arm as on the other.

Ten days ago was the first time that the mother noticed anything wrong with the child's back. The child has no subjective symptoms whatever. No pain or tenderness. It has three teeth, and its present weight is $13\frac{1}{2}$ pounds. It is poorly nourished, and its muscular development is below par. The child has a well-marked primary right dorsal scoliosis, with rotation of the bodies of the dorsal vertebræ. There are secondary compensatory lumbar and cervical curves. The lateral curvature is of the third degree. There are no evidences of rachitis.

DR. D. L. EDSALL and DR. C. W. MILLER read a paper on

THE DIETETIC USE OF PREDIGESTED LEGUME FLOUR, PARTICULARLY
IN ATROPHIC INFANTS,

with observations on absorption and metabolism. Bean flour and other legume flours have for many years past occasionally been used by members of the profession as well as by the laity in small amounts in feeding infants. Relatively little attention has been paid to this, however, and there has been no investigation of the actual suitability of such foods for infants. Unless predigested they must be difficult of digestion and it is impossible to give more than a very small quantity. The present study was undertaken for the purpose of determining by accurate observations to what extent predigested bean flour can be successfully given to infants, and how far it may be possible to use the nitrogenous constituents of bean flour in place of milk proteids, for it would seem to be readily possible to introduce as much as 1 per cent. of proteid from this source into a baby's food, and, if necessary, even much

more. The results obtained led to an investigation of the influence of bean flour on metabolism and to the conclusion that it is not improbable that it has some special influence favoring tissue building processes in atrophic infants. The results of three absorption experiments and one metabolism experiment in infants, and of a metabolism experiment in an adult showed that the bean proteid is absorbed very well indeed and that its influence on metabolism is at least equal to that of milk, and perhaps more than equal in this special class of cases. The starchy portion of the flour only was predigested and after this was done the bean flour solution was added to a milk mixture.

The clinical results in 28 cases, only 15 of them having been satisfactorily studied, however, were detailed. The results as to general improvement and gain in weight were very striking, the babies in nearly all instances gaining very rapidly, while previously they had been stationary or losing. The series, however, is still a small one and the results may be partly due to chance. So far as the study has been carried the results seem extremely encouraging as compared with those obtained by other methods of feeding atrophic babies in hospitals.

DR. J. P. CROZER GRIFFITH said that he had for a number of years been using freshly malted cereal gruels in certain cases, in the effort to avoid entirely the employment of any of the commercial malted foods on the market. Accident drew his attention to the question of the values of bean flour as a food, and he had urged the investigation of this upon Dr. Edsall. That explained his connection with the matter. The credit of the investigation rested entirely with Dr. Edsall. The great value of Dr. Edsall's results was not only that they prove clinically that children would often thrive remarkably upon a food mixture containing malted bean flour, but that they established scientifically the value of the vegetable proteid contained in it as a substitute for that of cow's milk, when the latter was found to be difficult of digestion. The investigation, by modern scientific methods, showed that the proteid was easily digested and assimilated. This was something which, as far as he knew, had never been done before. It was a very important addition to our knowledge of the dietetics of infancy.

DR. D. J. MILTON MILLER said that any method of feeding atrophic infants that proves to be at all successful would be ex-

remely valuable, and, therefore, he welcomed this addition to our armamentarium. He asked whether the infants would not be likely to develop scurvy on this food. He also desired to know whether any of the cases treated were acute cases, and, if so, whether the stools had been blackened by bismuth and whether there was much flatus, from the formation of sulphuretted hydrogen, which the legumes were well known to produce. For many years he had observed that as soon as bismuth began to blacken the stools in the acute enteritis of infancy, it was a sign that the case was beginning to improve; this he had attributed to the appearance of sulphuretted hydrogen, and a return to more normal conditions. It would be interesting to know whether bismuth administered simultaneously with legumes in similar cases would be converted into the black sulphid from the very first.

DR. HAMILL said that one great advantage of this method of feeding seemed to him to be that it enables one to use enough milk to protect the child from the development of scurvy.

DR. C. F. JUDSON said that he had come across the following remarkable formula for vegetable soup in a French medical journal, recommended by Méry in chronic digestive disturbances in childhood where milk has to be temporarily excluded from the diet. Boil 400 gm. of carrots, 300 gm. of potatoes, 100 gm. of turnips, 80 gm. of dried peas and beans, and 35 gm. of sea salt for four hours in seven quarts of water, and carefully strain the bouillon. The soup must be prepared fresh every day.

DR. EDSALL, in closing the discussion, said that none of the cases had acute symptoms when given bean flour, though several were convalescent from acute attacks. The points about the preparation that make it worthy of investigation are, that it is not proprietary, that it furnishes a means of increasing the proteid when it is difficult to do this with milk, that it seems to be easily digested and usually causes the digestion to improve in subacute cases, and that it can be given with as much milk as seems suitable in the individual case, thus avoiding, in large part at least, the disorders of nutrition, such as scurvy, that are likely to follow the exclusion of milk from the diet. It is also of importance that the food could be used exclusively, as a more or less temporary expedient, the amount of nitrogen in the bean flour alone being entirely sufficient for all purposes. This had been done with great success in one desperate case. It is the nitrogen content of the legumes that gives them their great value.

Current Literature.

PATHOLOGY.

Lancet Editorial: Case of Weil's Disease in an Infant.
(*The Lancet*, November 12, 1904, p. 1,363.)

Editorially *The Lancet* reviews this case of Brüning, of Leipsic, which was published in the *Deutsche medicinische Wochenschrift*.

The case of Weil's disease was in an infant four months old. After a chill the child had diarrhea, wasting cough and fever, with some jaundice. There was general tenderness of the body, and the spleen and liver were enlarged. The jaundice lessened and nephritis developed. From the urine and feces the bacillus proteus fluorescens was isolated. The child's serum showed little agglutination with this bacillus, but marked agglutination with the typhoid bacillus. The infant died in twenty-three days.

The autopsy showed fatty infiltration and degeneration of the liver and heart muscle, a purulent inflammation of the kidney parenchyma, and swelling of the lymphoid follicles of the intestine with submucous hemorrhages. The bacillus proteus fluorescens was obtained from the kidneys, lungs, spleen, liver, bile, and from the blood from the heart. Mice and guinea-pigs were affected pathogenically, when injected subperitoneally with this bacillus, the bacilli and not their toxins being the cause.

The Lancet views this case as extremely interesting, both from its occurring in an infant and from the pathologic and bacteriologic findings. However, it will be necessary to prove the constant presence of this bacillus in Weil's disease before we can regard it as the specific cause of the disease.

Babonneix, L.: Diphtheritic Paralyzes and Ascending Neuritis. (*Rev. Mens. des Mal. de l'Enf.*, April, 1904, p. 145.)

As clinical history has shown in nearly every case of diphtheritic paralysis, whether local or general, a remarkable connection between the primitive seat of inoculation and that of the consecutive paralysis, Babonneix made a series of experiments on rabbits in an endeavor to produce a paralysis analogous to that of the human subject. He injected varying doses of a diphtheria toxin, obtained from the Pasteur Institute, subcutaneously into

the paws of rabbits. If two or three were introduced, a local paralysis of the corresponding paw was produced. If the dose was slightly increased, the local paralysis first appeared, followed by sphincter troubles and later by an extension of the paralysis to either one, two, or three of the remaining limbs. In one case there was paralysis of the neck, and in another the cry was changed as if the paralysis had reached the larynx. On the third day the injected paw in each rabbit was paralyzed. On the fourth day, there was a generalized paralysis, the animals all being completely immobilized. The rabbits were all dead on the fifth day.

Babonneix next injected small doses of the toxin into the sciatic nerve of four rabbits, three in the left and one in the right nerve. In each case, paralysis of the paw injected appeared, followed by sphincter troubles. In 3 of these cases the paralysis attacked the opposite hind leg, and in one, the corresponding front paw. These animals did not die, but were used for autopsy purposes.

To make sure that traumatism of the sciatic nerve, due to the injection, was not the cause of these paralyses, the author injected the nerve of immunized rabbits with the toxin. No reaction or paralysis took place in any case.

Complete histological examinations were not made in every case, but the following results were obtained on autopsy:—

(1) Findings in monoplegias caused by subcutaneous injections:—In one case there were marked cellular lesions of the cervical cord; the cervical nerve roots were somewhat affected; all the nerves of the paralyzed paw showed a neuritis. In another case there was a marked granular swelling of the radial and ulna nerves of the paralyzed paw more marked *below* the point of injection.

(2) Paraplegias following injection of toxin into the sciatic nerve:—In one case there was found diffuse cellular lesions of the lumbar cord; unilateral degeneration of a few posterior nerve roots at their entrance into the cord. In another there were degenerative lesions of the principal nerves of the hind legs.

In one unilateral lesions of the cord; marked degeneration of the extraarachnoidal part of the anterior nerve roots; lesions of the ganglion; ascending degeneration of the corresponding posterior horn of the cord. In one case, medullary lesions; granular swelling of all the nerves of the hind leg and of some of those of the front paw.

The author observes that, although his pathologic findings are not complete enough to constitute an absolute proof that an ascending paralysis was present in each of these cases of experimental paralysis, he believes such was the case. He also considers that these paralyzes were enough analogous to diphtheritic paralysis in man, to believe that the pathologic cause of the paralysis is the same.

MEDICINE.

Taylor, James: Paralysis in Children. (*The Lancet*, November 12, 1904, p. 1,336)

In this clinical lecture, Taylor calls attention to certain essential characteristics of the paralyzes of children, which justify their being viewed from a special pediatric standpoint.

(1) These paralyzes occur in immature and growing structures, hence the greater deformity caused by the disease. (2) The paralyzes in children, aside from embolism due to heart disease, and syphilitic endarteritis, are usually the result of lesions of the nervous system proper and not of diseased conditions of the blood vessels, which are often seen in adults. (3) There are certain paralyzes which are truly birth palsies and do not occur in the adult at all. (4) In some children there appears to be an inherited tendency to early death of parts of the nervous system—the ambiotrophy of Gowers. Friedreich's ataxia and Marie's cerebellar ataxia are examples of this. (5) The same inherited tendency to early death appears in certain muscular structures, and is shown in the various muscular dystrophies.

Taylor spoke of the very varied modes of onset seen in anterior poliomyelitis and showed 2 cases of the disease. The first was a case of monoplegia of the left arm in a child of eighteen months, the shoulder muscles being most affected. The paralysis began with a sudden weakness of the arm which gradually increased to complete paralysis. In this case, the paralysis appeared to be the only symptom. The second case of poliomyelitis was a case of paralysis of both legs in a young child. The cause of this paralysis was a traumatism of a peculiar kind. The child, when six months old, was dropped by her nurse. The infant became unconscious and, later, the paralysis appeared. Taylor believes that traumatism is often a cause of paralysis, but that usually a limb is injured by the spontaneous fall of a child.

A case of left hemiplegia due to syphilitic endarteritis in a child was shown. The paralysis appeared without convulsions, but with a difficulty of articulation. The diagnosis was established by finding a marked, disseminated choroiditis characteristic of late syphilis. In this case, the paralysis was flaccid and the limbs were not much wasted.

The lecturer showed a case of pontine tumor in a child. The history of the case was as follows:—Seven months before, he began when at school, to write off the line. On being spoken to, he complained of poor sight. Next a squint appeared. Three or four months afterwards he threw his left leg out when walking. Very soon he began to stagger, and now he falls to one side unless he uses great care. Three months ago he began to lose the use of his left hand. Two months ago his speech became affected and there was difficulty in swallowing. There also appeared weakness of the left side of the face. He has now almost complete ophthalmoplegia. In the left eye there is practically no movement. In the right there is little movement beyond the median, and these slight movements are nystagmoid. He has complete paralysis of the palate and of the fifth left nerve. He has had headache and vomiting at times. Up to the present there has been no optic neuritis. Taylor considers this a typical case of pontine tumor. Some cases of Friedreich's disease and of muscular dystrophies were shown.

Dunlop, G. H. M.: Syphilitic Synovitis in Children. (*The Lancet*, November 12, 1904, p. 1,351.)

Dunlop believes that syphilitic synovitis is not at all rare, and that this condition is often treated for tuberculosis, with the result that the child often suffers from a fixed joint. There are two varieties of this disease. The first occurs usually during the first three months of life. There is degenerative change in the epiphyseal cartilage, and sometimes it is detached. There is thickening of the periosteum and effusion into the joint. The synovitis attacks the elbows most commonly, and both sides are usually affected. Recovery takes place rapidly under mercurial treatment and the epiphyses unite, but there is shortening if the cartilage has been much destroyed.

The other form of synovitis occurs between eight and fifteen years. It is usually a painless synovitis of both knees, one side being affected before the other. There is no bony enlargement

or creaking, and the movements of the knee are free. Symmetrical keratitis often accompanies the synovitis, and there may be present Hutchinson's teeth, nodes on the bones, and deafness. It is sometimes difficult to diagnose this syphilitic synovitis from tuberculosis, and there may be a mixed infection of the two. Mixed treatment gives better results than does mercury alone.

Cherno-Schwarz, B. N.: Coli-bacillary Cystitis in Children. (*Medix. Obos.*, Vol. Ixiii., No. 2, p. 99.)

Since the first observations of Escherich on cystitis due to the coli-bacillus, numerous authors have been able to confine this etiology and to establish the fact that cystitis in childhood not infrequently appears as a complication of gastrointestinal disturbances. The clinical picture of coli-bacillary cystitis presents a variety of manifestations in all grades of severity. At times subjective symptoms are entirely absent and only the urine bears testimony to the affection; again, the disease runs a violent course, with sharp local and general phenomena; between these extremes are transitional forms of every grade of severity.

The author contributes the history of several new cases which clearly illustrate the usual mode of origin of coli-cystitis, namely, through migration of the bacilli from the rectum into the bladder *via* the urethra. Three patients were girls, and this avenue of infection notoriously holds good for females. In the fourth patient, a male, the bacilli probably reached the bladder from the rectum by way of the intermediate connective tissue, which in this case lay near an abscess communicating with the bowel.

Penrose, F. G.: A Case of Infantile Convulsions due to Uremic Poisoning. (*The Lancet*, November 12, 1904, p. 1,346.)

This case occurring in a boy, one month old, was admitted to St. George's Hospital, London, at nine o'clock one evening last summer. The mother gave a history of "screaming fits" for twelve hours before admission, and for three days there had been a rash on the buttocks. On admission there were noticed some tonic contractions of the hands and fingers. The eyes were fixed, but the child rested quietly. The chest pitted slightly from the pressure of the stethoscope, but there were no other signs of edema. The temperature was normal. The rash on the buttocks appeared to be the remains of broken-down pustules.

The tonic contractions of the hands ceased soon after admis-

sion and the baby slept. Two more attacks of these convulsions occurred during the night, with cyanosis and shallow breathing; and a fourth attack at nine o'clock the next morning, during which the child died. There had been no general convulsions.

The autopsy showed nothing in the brain or cord but a few petechiæ and a general hyperemia. The kidneys, ureters and bladder were removed *en masse*. The bladder was filled with greenish, purulent pus, and was somewhat dilated. Its wall was congested and thickened. The ureters were much dilated, and were also filled with the pus. The kidneys showed advanced pyelitis, and the cortex of both was studded with abscesses. There was a very marked phimosis, but no other obstruction to the flow of urine was found. On questioning the mother she said that the baby had never had retention of or pain on passing urine, but that he had never seemed to pass the normal amount. She had noticed no other symptoms until the rash on the buttocks appeared, three days before the baby's admission to the hospital.

SURGERY.

Kirmisson, M. E.: Traumatic Dislocation of the Epiphyses. (*Annal. de Méd. et Chir. Infant.*, December 15, 1904, p. 831.)

Roentgen's discovery has occasioned notable progress in the study of diseases involving the joints, especially traumatic affections, such as fractures and luxations. The study of epiphyseal dislocations has been much aided by new methods. Before the discovery of Roentgen it was difficult to determine whether the lesion was a fracture near a joint or a separation of the epiphysis. Thanks to radiography we can now determine accurately the anatomic position of a lesion.

The writer states that, in a vast majority of cases, epiphyseal separations are due to indirect causes. Kirmisson discusses the subject further under the heads:—Pathological Anatomy and Study of the Principal Varieties of Epiphyseal Separation.

Dolley, D. H.: Blank Cartridge Tetanus. (*Journal of the American Medical Association*, February 11, 1905, p. 466.)

Blank cartridges from several makers were investigated with special reference to their bacteriologic contents, by cultural and incubation, as well as by microscopic methods. The findings were

rather negative as regards the tetanus bacillus, but the *Bacillus aerogenes capsulatus* (Welch) was present in a large proportion of the cartridges examined. Notwithstanding this fact tetanic symptoms developed in a number of the animals inoculated, and in still other animals inoculated from cultures from these. His conclusions are:—(1) *B. aerogenes capsulatus* (Welch) is present in a large proportion of the wads of the three makes of the cartridges examined. (2) The wads of the Peters Company, inoculated in rats, guinea-pigs and rabbits, produced characteristic symptoms of tetanus. (3) The powder of the three varieties of cartridges examined were negative for *B. tetani* and *B. aerogenes capsulatus*. (4) My efforts at isolation of *B. tetani* from the wads have so far been unsuccessful. (5) There is abundant evidence, from clinical observations and animal experiments, that the wads of certain blank cartridges contain *B. tetani*. He says that Dr. Welch told him that he considered it diagnostic to see an animal in convulsions.

Borland, H. H.: A Case of Exophthalmos in the Newly-Born. (*The Lancet*, November 12, 1904, p. 1,344.)

This case occurred in the child of a multipara. Labor began at midnight, and the membranes ruptured at 4:30 A.M. When the doctor first saw the case at 5:15 the os was dilated to about the size of a dollar. The presentation was a vertex. The labor had scarcely progressed any at 2 P.M., and the doctor left. Half an hour later, in his absence, the child was born on the floor. When he arrived, the mother stated that the child's head had not been "dumped" on the floor, as after it was born there was delay at the outlet, and she had time to lie down on the floor before the rest of the child appeared. The child was breathing badly and artificial respiration was used successfully. The top of the child's head was perfectly flat and at right angles with the frontal bone. There was an extreme exophthalmos of both eyes. The eyes protruded so that the lids would not meet. In a few hours a subconjunctival hemorrhage appeared at the upper sclerotic region of the right eye. This was more marked the next day and a decided bulging downward of the right eye was noted. This was undoubtedly due to paralysis of the superior rectus. On the third day some ecchymosis of the right upper eye lid was noted, and on the fifth day an ecchymosis appeared on the left lid. By the tenth day the exophthalmos had disappeared. On the eleventh day the sub-

conjunctival was cleared up, and about the same time the ecchymosis of the lids. On the nineteenth day a clot of brown blood came down from the right nostril. The paralysis of the right eye persisted until the twenty-second day. The child completely recovered, and at three years of age was strong and healthy.

Borland says the cause of this exophthalmos is difficult to explain. In this case there was no question of injury from forceps, and it is improbable that early in the labor the presentation was facial with the cranium pressing on the promontory. There was no pelvic deformity in the mother. The congestion of the veins of the neck, caused by pressure from the external orifice during the delay after the birth of the head, might be a cause.

Borland is of the opinion that there was an injury of the cavernous sinus of the right side originally, which spread rapidly to the left. The communication would be through the circular sinus. The extent of the blood effusion and its slowness in absorption, might be accounted for by the relatively slight coagulability of an infant's blood.

HYGIENE AND THERAPEUTICS.

Lowenburg, H.: Treatment of Chronic Internal Hydrocephalus by Lumbar Puncture. (*American Medicine*, August 6, 1904, p. 217)

A boy, aged twenty months, was admitted to the Philadelphia General Hospital November 30, 1903, suffering from well-marked chronic internal hydrocephalus. His head measured 19 inches in circumference at the level of the occipital protuberance, and the superior circumference of the head from ear tip to ear tip was 11 inches. Lumbar puncture, without anesthesia, was begun on December 5th, and continued at intervals of from three to twelve days until January 28, 1904. On December 19th the head measurements were:—circumference $18\frac{3}{4}$ inches and the measurement from ear to ear $10\frac{1}{4}$ inches. On January 31st the same measurements gave:—18 inches and $10\frac{1}{4}$ inches, respectively. After each puncture the fontanel became distinctly scaphoid, showing free communication between the ventricles and the spinal canal. Between the time of the punctures the fontanel was level with the head, but the size of the head was never materially increased.

The child became brighter and improved mentally. Its health grew better and at first its weight increased; later it became stationary. Unfortunately, the boy contracted measles and pneumonia in the hospital and died February 17, 1904.

Notwithstanding the death of this child from intercurrent disease, Lowenburg considers that the results obtained were sufficient to encourage the trial of lumbar puncture in similar cases. Such treatment should be instituted before the age of two years, after which the ossification of the cranial bones is too far advanced.

Zahorsky, John: The Serum Treatment of Summer Diarrhea. (*St. Louis Courier of Medicine*, March, 1904, p. 129.)

In July, 1903, an epidemic of gastroenteritis broke out at the Bethesda Foundling Home in St. Louis. This was presumably caused by the milk which was not sterilized. The symptomatology showed nothing remarkable. Except in a few cases the fever was not high, and only in 2 cases did blood appear in the stools. In all the cases, however, there were marked disturbance of the circulation and rapid emaciation, and the mortality was high. The bacteriologic tests showed a bacillus resembling the colon bacillus, but its relation to the Shiga bacillus was not determined. The agglutination tests gave no specific results.

Many of the cases were treated with a serum obtained by injecting horses with the Shiga bacillus. Two of the cases which received this treatment made a slow recovery, but, on the whole, the treatment had no beneficial results. The general treatment outside of the serum treatment was:—substitution of rice-water for milk; the administration of camphor and oil of cinnamon in emulsion. Bismuth was given in most cases, and enteroclysis in the severe ones. For pain chloral was used, and for the vomiting, magnesia and validol. Stimulants were added in many cases.

On 2 cases, a serum made by injecting horses with several varieties of the dysentery bacillus was tried. These were severe cases of gastrointestinal infection. Both of them recovered promptly under the use of the serum.

Zahorsky concludes that the serum obtained from the Shiga bacillus is too uncertain in its action for general use. He would try the mixed serum in severe cases of summer diarrhea, even though 2 cases are too small a number on which to base conclusions.

Brower, Daniel R.: Treatment of Idiopathic Epilepsy. (*Journal of the American Medical Association*, March 25, 1905, p. 950.)

Brower says that spontaneous cure of this disease is possible, and mentions one of several cases in his observation. He calls attention to the necessity of more care as to the prevention of the trouble, especially in infants suffering from convulsions. Proper treatment and environment in these cases may prevent the later development of the disease. The treatment of the individual convulsions is also important, and the aura may afford a warning that enables the patient to abort the attack. He advises the carrying by epileptics of nitrite of amyl pearls for this purpose. Other methods may also be effective in special cases. In epilepsy there is an autointoxication, usually of gastrointestinal origin, and the diet should be carefully regulated. These patients are usually very hearty eaters and it is advisable to restrict the diet in quantity, to regulate periods of eating and to insure thorough mastication and digestion. Intestinal elimination must also be attended to, and for intestinal antiseptics he finds salol combined with phytolacca often very useful. For combating the nervous irritability the bromids are most useful and he prefers the sodium salt. Their overuse, however, is dangerous, and Brower refers much of the existing epileptic insanity to this cause. The dose should seldom exceed 60 grains daily in plenty of water after eating. Strychnia is also a valuable remedy for meeting the circulatory and vasomotor defect, and he specially recommends fluid extract of *Adonis vernalis*. In conclusion he insists on the importance of allowing plenty of time, at least five years after disappearance of symptoms, before claiming a cure of epilepsy.

Süsswein, Dr. Julius: The Physiology of the Mechanism of Drinking in the Infant. (*Jahrb. f. Kinderheilk*, Vol. xl., 1904, p. 68.)

The number of observations made was sixty-two; the technique employed was simple, but involved considerable trouble. Before nursing each child was accurately weighed; the time when the infant began to nurse was noted. During the process the acts of sucking and swallowing were watched, the latter could best be appreciated by means of palpation. At intervals the child was weighed, the amount of milk ingested being thus determined. Frequent weighing was necessary during the beginning of nurs-

ing, subsequently the amount taken was so small that it was hardly appreciable by the scales. The information obtained by means of this study was as follows:—The observation of the mechanism of drinking in the infant makes it possible to estimate approximately the amount of nourishment ingested and yields a means of judging whether the breast of the nurse is suited to the individual case. When each act of sucking is followed by swallowing, and the greater part of the nutriment is taken within the first five minutes, the breast may be considered an ideal one for the purpose. If a child nurses with frequent interruptions and swallowing occurs rarely, the breast may be regarded as unsuitable for the needs of the child. The scales furnish valuable information and cannot be dispensed with.

Guinon, L.: The Abuse of Milk in Infantile Therapy. (*Rev. Mens. des Mal. de l'Enf.*, March, 1904, p. 97.)

The time honored dictatè that milk is the "ideal," or the "perfect," food for infants and young children in any and every case is strongly opposed by Guinon. Not only does this apply to cow's milk, but sometimes to human milk as well. In his article he gives numerous histories of children who not only do not thrive on milk but are attacked with serious gastrointestinal troubles from its use. In general these cases may be divided into four classes:—

(1) The child has appeared to do well on the breast or on sterilized or boiled milk up to the end of the first year. The digestion, however, has never been perfect and from time to time intestinal disinfection has been necessary. When the child has reached a light, mixed diet an indigestion appears. Ordinarily the physician puts the child back to an exclusive milk diet. In almost every case the digestive trouble increases.

(2) A child brought up on the breast has been habitually constipated, his appetite is poor and his digestion difficult. Instead of varying his diet, the exclusive use of milk is continued with the result that a gastroenteritis often develops.

(3) During the second year a child is eating eggs, soups, etc., which it digests well. Unfortunately, however, its sole drink is milk. This is given whenever he is thirsty, at meals and between meals. The milk does not quench his thirst, but he drinks it in increasing quantities. Finally his stools become fetid and sometimes he vomits, takes a distaste for milk and refuses it. In

the latter case the intestinal indigestion disappears, but if he continue it the indigestion grows worse.

(4) For some reason the child has an intestinal infection more or less acute. He has grown better under proper treatment, but the milk has been resumed and the child continues to have abnormal stools with either constipation or diarrhea.

In nearly all the author's cases the children's parents were in easy circumstances and the milk was carefully sterilized or boiled, and in case of breast-fed infants the milk appeared to be of good quality. Notwithstanding this the children were pale, listless, and illy-nourished, although many of them were fat. Vomiting, with fetid breath, occurred in many cases, while in all the stools were undigested. Anemia was almost always present.

Guinon's treatment was to withhold milk altogether for a time, or to decrease the quantity, usually giving it combined with farinaceous foods. Soups were given in most cases, and sometimes raw beef or mutton, yolk of egg or buttermilk. The intestine was disinfected with calomel or castor oil, and the anemia was treated with iron; or sometimes raw beef or mutton was relied on for this purpose. In nearly all the cases the children improved, and after a greater or less time a small amount of milk was borne, either raw or in milk gruels.

Guinon considers that the chemistry of the digestion of dispeptic children is still so obscure that we cannot yet give a rational reason for their poor digestion of milk.

Schlossman, Arthur: The Quantity, Kind and Significance of Phosphorus in the Milk and what, in part, becomes of it in the Infant Organism. (*Jahrb. f. Kinderheilk*, Vol. xl., 1904, p. 1.)

The writer examined thirty-nine specimens of mother's milk for phosphorus. The results of this analysis are tabulated under the heads—Case number, name of nursing woman, day of lactation, the amount of P_2O_5 and N, in grams per litre of milk, as well as the proportion of P_2O_5 to N.

Summarizing briefly, Schlossmann says that an increase in the quantity of casein is the only factor which affects the amount of phosphorus in milk. All extrinsic factors, such as duration of lactation, menstruation, occurrence of fever, etc., were found to be without appreciable effect upon the amount of phosphorus in milk. In order to determine the disposition of phosphorus in the infant organism certain experiments were made. Different foods

were tried in one case and the feces were analyzed. In a final table the writer records the weight, age and nutriment of the child. The quantity of $P_2 O_5$ in the food and feces and the amount absorbed, were noted as well as the daily gain in weight.

Leuriaux, C.: The Treatment of Pertussis with Antipertussis Serum. Résumé of a Communication made to the Clinical Society of the Brussels Hospitals. (*La Pathol. Infant*, November 15, 1904, p. 250)

The writer describes a bacillus isolated by him from the sputum and nasal mucus of children suffering from pertussis—450 specimens of sputum were examined. He regards the organism as the cause of whooping-cough, has prepared an antipertussis serum and reports good results from the use of the same. The micro-organism is described as a short, thick motile rod of ovoid form—it is Gram positive and grows rapidly at a temperature of $37^{\circ}F$. upon bouillon, agar, gelatin, serum, potato and milk. The rod stains well with anilin dyes.

Leuriaux mentions finding the bacillus in the nasal mucus in the premonitory stage of the disease; this is an important aid in diagnosis. The presence of the organism in the nasal secretion thus early also demonstrates, in the opinion of the writer, that infection in pertussis occurs by way of the nasopharynx; this opinion was voiced by him ten years ago. The technique of the preparation of the serum is given. Subcutaneous injection is employed; it induces a local reaction—painful edema. A general reaction is shown by a rise of temperature.

Moro, Ernst: Comparative Studies of Digestion Leukocytosis in the Infant. (*Jahrb. f. Kinderheilk*, Vol. xl., 1904, p. 39.)

Moro made a systematic study of digestion leukocytosis in healthy infants. The numerical variation of the leukocytes in healthy, breast-fed children was first studied and later the writer endeavored to discover whether special variations occurred as a result of artificial feeding. The technique employed was uniform throughout.

As a result of the counts made the writer considers that the leucopenia which occurs in the breast-fed infant shortly after nursing is a physiologic process. In infants who had been artificially fed for a considerable time the variation in the number of leukocytes proved to be so great that no rule could be formulated in these cases.

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[No. 5

Original Communications.

CONGENITAL TUBERCULOSIS.

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As the cases of undoubted congenital tuberculosis recorded in medical literature are not numerous, the report of the pathology of the following case seems warranted.

A woman died in the Lying-in Hospital of advanced tuberculosis six days after the birth of a male child, in the eighth month of pregnancy.

REPORT.—The *placenta* measured 16 cm. in diameter and 3 cm. in thickness; its cord was implanted eccentrically. There was no marginal rim of infarcts and no larger infarct at any point. A triangular area measuring 5 x 7 cm., with its base at the placental margin and its apex near the insertion of the cord, was yellow in color, soft in consistency, and suggested cheesy material. There were two small yellow tuberculous areas in another cotyledon. Greyish nodules were numerous over the membranous surface, but, on comparison with a normal placenta, these did not seem to be miliary tubercles. The triangular cheesy area extended to and involved the membranes, the maternal surface of which was more roughened here than at any other point. The fetal surface of the membranes was apparently roughened, as though covered with a fibrinous exudate, over this area of 2 cm. by 3 cm. in diameter. Over the other two cheesy masses the fetal surface was in a similarly roughened condition.

Smears from the yellow area stained with carbolfuchsin and Gabbet blue showed many tubercle bacilli, some of them in small groups of four or six.

On microscopic examination of the placental sections the chorionic membrane was found to contain areas of necrosis in which nuclear fragments were numerous, and few cell bodies were preserved. The central portion of these areas resembled cheesy

material, and giant cells in small numbers were found at the edge of the cheesy centre; epithelioid cells were not present. The areas were irregular in shape, passing gradually into the normally preserved chorion without any limiting zone, and involving the amnion, whose covering epithelium was completely destroyed and its free (fetal) surface covered with granular fibrin and nuclear fragments. Large vessels in the chorion contained thrombi of agglutinated red-blood cells, staining bright red with eosin and not always filling the lumen of the vessel completely.

Many intervillous spaces contained fibrinous masses similar to those seen in normal placental sections. In other cases the spaces contained masses which were more homogeneous, almost hyalin in appearance, and surrounded by leukocytes whose nuclei were almost all fragmenting. These masses either filled the space between two villi completely or touched only one villus. But where they came in contact with the villus, the covering epithelial cells were wanting, although present immediately beyond the point of contact. This point is of interest regarding the question as to whether or not a normal syncytium is an efficient bacterial filter, and thus a protection to the fetus. Certainly the agglutination thrombi had destroyed the syncytium in this case, while in no section were the epithelial cells affected over a villus whose adjacent spaces were empty, or filled with normal blood cells, or with fibrinous masses.

Many villi were normal. Some contained small cheesy tubercles in their stroma, beneath an adherent thrombus, and others were fused together into necrotic masses in which the villous outlines were more or less completely lost, cheesy matter and a few giant cells occupying the centre. These tuberculous areas were readily distinguished from small white infarcts, of which a few were present in the sections. Tubercle bacilli were found in the tubercles in the chorion, in the cheesy masses in the villi, and in the intervillous spaces both free and in the thrombi. Warthin and Cowie¹ call attention to agglutination red-cell thrombi in the intervillous spaces of the placenta in their case.

Schmorl and Geipel² have recently described placental tuberculosis as occurring in four forms, dependent upon the localization of tubercle bacilli:—On the periphery of the villi, when the tubercles form in the intervillous spaces; in the interior (stroma) of the villi; in the basal decidua; in the chorion, involving the amnion as well. The first form is the most frequent one, and oc-

curs especially in placentas which are fully formed; the third variety, on the other hand, occurs in the early months of pregnancy. The second variety is very rare as a primary placental lesion (Schmorl having found it but once), though, as in our case, tubercles in the substance of the villi often occur secondarily to their formation in the intervillous spaces. The rarity of this form of primary placental tuberculosis would argue against the villus involvement while the syncytium remains normal. So that the case here described illustrates the intervillous chorionic localization of tubercle bacilli, with secondary involvement of the villus stroma. Schmorl describes 1 case in which the tuberculous area in the chorion had perforated the amnion and tubercle bacilli were found on the surface of that membrane. Thus, says Schmorl, there is the possibility of gastrointestinal infection of the fetus by means of tubercle bacilli in the liquor amnii. In this connection, the case of Herrgott and Haushalter,³ in which guinea-pig inoculations with amniotic fluid gave positive results, is of great interest; and it is to be regretted that no such fluid was obtainable in our case, where the placental lesion points to infection of the amnion and liquor amnii.

The *umbilical cord* showed no tuberculosis on gross or microscopic examination. Nor were tubercle bacilli found in the vessels of the cord in the sections.

As no autopsy was permitted, the mother's uterus was removed through the vagina three hours after death. The *uterus* measured 16 cm. in length and was very flabby. Its peritoneal surface was covered with young, translucent tubercles in large numbers. On opening the organ a large shred of apparently necrotic placental tissue presented itself. This was but slightly adherent, and beneath, as well as around it, there were cheesy areas varying from 1 to 5 cm. in diameter. There were several small cysts on the cervical mucosa, but no signs of tuberculosis were visible. The placental site in the upper portion of the anterior uterine wall was covered with small clots and shreds, of which that above mentioned was the largest. The tubes and ovaries were normal in size and appearance. Tubercle bacilli in large numbers were readily found in smears from the endometrium and from the large necrotic mass.

Microscopic examination showed the uterine lining to have the structure of the decidua at term. At many points cheesy degeneration had occurred throughout its entire thickness, extend-

ing into the muscle coat to an irregularly varying depth, while small tubercles with cheesy centres were scattered throughout the middle and inner muscular coats, even at some distance from the cheesy endometrium. Tubercle bacilli were demonstrated in the cheesy areas and also in decidual sinuses which were not adjacent to a cheesy mass.

AUTOPSY ON INFANT.—The male child lived nineteen days.

At autopsy its body was small and poorly nourished. It presented no skin lesions. The dried cord stump was still adherent.

Brain.—No hemorrhage and no tubercles. Ventricles normal.

Heart.—Valves normal. Foramen oval, open. Muscle anemic.

Lungs.—No pleurisy, no atelectasis. A few small bronchopneumonic areas were scattered through both upper and lower lobes. In the right upper lobe, near the upper part of the posterior border, were two small, gray tubercles, each 3 mm. in diameter. No other tubercles were present. The bronchial lymph nodes were not enlarged; red in color.

Spleen.—Weighed $8\frac{1}{2}$ grams and measured $4\frac{1}{2} \times 2$ cm. It was firm, dark red, and showed small, grayish points on the surface and in its substance resembling miliary tubercles.

Liver.—Was moderately fatty and deeply congested, but not enlarged in size. Small tubercles were scattered over the surface and throughout all the lobes. One cheesy tubercle of 2 mm. was present in the right lobe. The round ligament contained fluid blood. No enlarged lymph nodes in the hilus.

Stomach.—Normal.

Intestines.—The mucosa in the colon and lower ileum was congested. The Peyer's patches and solitary follicles were swollen, but none were ulcerated. *Mesenteric lymph nodes* were enlarged, but not cheesy.

Peritoneum.—Contained no fluid. The mesentery was studded with small grayish nodules which outlined the lymph vessels, and resembled tubercles.

Kidneys.—The boundary zone of each kidney contained from 3 to 5 small tubercles. No other lesions present. Weight, 17 grams. *Suprarenals* and *pancreas* normal.

Anatomical Diagnosis.—Acute miliary tuberculosis of lungs, liver, spleen, (?) kidneys and mesentery (?). Bronchopneumonia. Fatty liver. Hyperplasia of lymph nodes.

MICROSCOPIC EXAMINATION.—*Lung.*—Tubercles with cheesy centres and surrounded by monocular round cells, but no

giant cells were found around small blood vessels. The surrounding lung tissue showed alveoli filled with desquamated epithelium, fibrin, and pus cells, which also infiltrated the alveolar walls. All blood vessels were deeply congested.

Spleen.—No tubercles could be demonstrated in any section.

Liver.—The tubercles were very small and devoid of giant cells. They were situated at the periphery of the lobules around the portal vessels. The connective tissue was nowhere increased and the bile ducts were normal.

Kidneys.—The tubular epithelium showed a moderate amount of parenchymatous degeneration, and in the boundary zone around a blood vessel two small tubercles were present.

The Mesenteric Lymph Nodes.—Showed hyperplasia of their lymphoid cells and of the lining cells of the sinuses, but no tubercles were present. The blood vessels were congested. No bacilli found in any sections.

Colon.—The covering epithelium had disappeared. The glands were normal and the solitary follicles congested, but showed no signs of tuberculosis.

It is evident that the tuberculous infection in this case was hematogenous in character. From the gross appearance of the mesentery at autopsy, it seemed probable that, in addition, there had been infection by means of the amniotic fluid. Such was apparently not the case, though again it is to be regretted that no animal inoculations were made with the mesenterics.

Smears from the heart's blood and umbilical vein were negative for tubercle bacilli. In smears from the liver a few tubercle bacilli were found after looking through a number of slides.

A portion of the right lobe of the liver was removed by sterile instruments into a sterile, glass-covered dish and cut into small pieces with sterile knives. The fluid thus expressed was injected into a healthy guinea-pig. For forty-eight hours afterward the animal seemed ill, but then recovered its appetite and seemed lively. A nodule appeared in the right groin near the point of injection, and the pig lost weight. On the thirty-fifth day it was chloroformed to death. The node in the right groin measured 2 x 5 cm. in diameter, and had a softened cheesy centre, smears from which showed large numbers of tubercle bacilli. Smaller tubercles were found on the parietal peritoneum near the largest node. The spleen was much enlarged and studded with cheesy tubercles. The liver contained many gray tubercles. None were

present in any other viscus. Sections from the liver and spleen confirmed the evidence of tubercles in these organs; tubercle bacilli were also found in them.

LITERATURE.—The first undoubted case of congenital tuberculosis was described by John⁴ in 1885, and occurred in a calf fetus of eight months, found in the uterine cavity of a cow which died of phthisis, the uterus and placenta being normal. Since then numerous cases have been described by other veterinarians, until in 1898 more than 60 cases of calves with congenital tuberculosis had been reported, and Klepp⁵ estimated that 2.63 per cent. of all calves born of tuberculous cows are tuberculous themselves.

Human cases of congenital tuberculosis are much less frequent, Schmorl and Birsch-Hirschfeld⁶ being the first to describe the case of a seven months' fetus born of a tuberculous mother and showing tubercle bacilli in its liver and in the placenta, no histological changes of tuberculosis being present. Sabouraud⁷ was the first to describe a well authenticated case of congenital tuberculosis in which miliary tubercles were found in the liver and spleen of the infant. Doubtful cases have been reported since the year 1825, but in the absence of convincing microscopical examinations these must remain unproved. Hauser,⁸ reviewing the literature in 1898, found 18 cases which he considered as undoubted tubercular infection of the fetus, or at least as cases of "transmission of tubercle bacilli into the fetal circulation," and which he classified as follows:—9 with extensive tuberculosis of the fetal organs; 5 in which tubercle bacilli without the presence of tubercles were found in the fetal organs, and 4 cases of placental tuberculosis.

The literature has been critically reviewed within the last year by Warthin and Cowie,¹ whose stricter classification has served to separate the undoubted from the doubtful cases, the criteria required being "the presence of characteristic anatomical changes and of tubercle bacilli, the development of the lesions within such a short time after the birth as to preclude the possibility of extra-uterine infection, and the exclusion of syphilis." From this point of view the undoubted cases of congenital tuberculosis were reduced to 5, accepting 3 of Hauser's 9 (Honl,⁹ Sabouraud and Lehmann¹⁰) and adding those of Ustinow¹¹ and Auché and Chambrelente.¹² Veszprémi's¹³ case has been reported since the appearance of Warthin's paper, and thus the case here reported is the seventh of undoubted congenital tuberculosis to be recorded.

The 4 cases of placental tuberculosis mentioned by Hauser are all accepted in Warthin's stricter review, and 2 reported by Warthin¹⁴ and that of Auché and Chambrelente added. To these the cases of Runge¹⁵ and Warthin and Cowie, as well as our own, must now be added. Veszprémi, unfortunately, was not able to examine the placenta in his case. Schmorl and Geipel found 9 tuberculous placentas among 20 examined in cases of tuberculosis. Hauser omitted a second case of Lehmann's. There are, therefore, 20 cases of placental tuberculosis recorded up to the present time. One of Warthin's cases is of special interest, as it was one of ectopic gestation in which tubercles were demonstrated in the tubal sac and in the placenta, few tubercle bacilli being found. The fetus was between three and four months old, and no tubercles could be positively demonstrated in its viscera. The umbilical cord in this case also showed several nodules, one with a cheesy centre, the microscope picture of which resembled that of tubercles.

Finally, the 5 cases mentioned by Hauser in which tubercle bacilli without the histological lesions of tuberculosis have been found are augmented to 12 in Warthin's review, and, with that of Warthin and Cowie, now number 13.

The lesions in the fetus of our case were very few and recent, considering that the child lived nineteen days. The fact recalls the case of Doleres and Bourges,¹⁶ in which the child of a tuberculous mother died five weeks after birth and no tubercles were found in its organs, although the heart's blood inoculated into a guinea-pig gave a positive result. Warthin calls attention to this case and his own in relation to latent congenital tuberculosis and immunity of the fetal tissues, the virulence of the bacilli present having been proven by inoculation into guinea-pigs. Schmorl and Geipel believe that a few tubercle bacilli may be destroyed in the infant's body, but many cause tuberculosis, usually in early infancy. It is possible, but not probable, that they may remain latent until puberty.

Summing up the pathology of our case in the light of Schmorl's work on tuberculosis of the placenta, and considering the advanced stage of the tuberculous lesion in the endometrium, we may assume that the basal decidua was first affected, the tubercle bacilli traveling from the decidual sinuses to the covering of the villi, localizing there and causing thrombi in the adjacent intervillous spaces with destruction of the syncytium, entering the

villous stroma and finally reaching the chorion. Thus all four varieties of placental tuberculosis are illustrated in this case. That the fetus was infected comparatively late (just before birth) might be argued from the early stage of the tubercles in the child, which had lived for nineteen days.

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Agglutination in Scarlet Fever.—It is still an open question whether the streptococcus is the causal agent of scarlet fever or merely a secondary parasite. The experiences related by Hasenknopf and Salge (*Jahrb. für Kinderhk.*, Vol. LVIII., No. 1), show that scarlet fever streptococci are agglutinated by serum from scarlet fever patients, but that the serum loses this property as convalescence terminates. Streptococci from other sources are not influenced by scarlet fever serum, and serum from other sources does not agglutinate the scarlet fever streptococci. Passage through animals attenuates, but does not entirely abolish the agglutinating property. The agglutination observed indicates, however, that there is some direct biologic connection between the streptococci and the scarlet fever subject. Notwithstanding this, Hasenknopf and Salge do not think we are justified in assuming that the scarlet fever streptococcus is necessarily the specific causative agent. They are also very dubious as to whether an anti-streptococcus serum derived from the horse will find in the human body the needed complements.—*Journal of the American Medical Association.*

THE DIAGNOSIS OF APPENDICITIS IN CHILDREN.*

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Appendicitis in infancy and childhood is one which apparently, in the literature at least, has not received its just attention. In reviewing the literature I find a very limited number of writers taking up this important subject in detail, most contenting themselves with the reports of a few cases.

The importance of this field to the pediatricist becomes apparent, if we can rely upon the percentage statistics of its occurrence in some of the larger clinics:—

Einhorn reports that children between 1 and 15 years of age represent only 2 per cent. of all his hospital patients, from which Selter deducts that appendicitis is 7 times as frequent among children as in adults.

Erdmann reports a total of 250 cases of appendicitis with 201 operations; of these 29 were children under the tenth year, with 22 operations resulting in 20 recoveries and 2 deaths. All were acute cases, 9 were operated on in the primary attack and 11 in the secondary or multiple attacks; in 2 not stated. There were 14 cases of gangrene and perforation; 7 cases of foreign bodies, 4 cases of the latter containing from 6 to 30 pin-worms each. As to age, 1 occurred at 3 years, 2 at 5, 3 at 6, 7 at 7, 4 at 9, and 5 at 10 years.

Matterstock reports 46 cases under 10 years of a total of 474 cases; Fitz 22 out of 228 cases; Sonnenburg 14 out of 130 and Nothnagel 1 out of 130; but the latter believed this to be due to the fact that children are rarely received in his clinic. Griffith has collected 15 cases under 2 years of age, 2 of which, Pollard's and Gayen's, were six weeks of age. McCosh in his first 1,000 operative cases of appendicitis found 1.7 per cent. operated in the first 5 years, while 7.5 per cent. had shown symptoms during the first ten years. Clodo has described a fold of peritoneum extending from the appendix to the ovary, the appendiculo-ovarian ligament, which carries a bloodvessel to the appendix. This, together with the fact that the appendix of the female is smaller

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than that of the male, may account for the comparatively small percentage of attacks among girls; according to most authors it is not more than one-half as frequent as in male children and infants.

The high percentage of appendicitis in childhood is thought by Sahli to be due to the great amount of lymphoid tissue in the appendix at this early age, and its tendency to rapid increase and secondary degeneration under prevailing influences; so common does he believe this to be that he definitely names it "Angina of the Verniform Appendix." Klemm carries the analogy still further by suggesting this to be but a type of the inflammation to which all organs rich in lymphoid tissue are subject, examples of which are represented by lymph-adenitis, tonsilitis, osteomyelitis, etc. As in case of the tonsils, an organ so infiltrated is readily affected by intercurrent traumatism, circulatory disturbances and injuries by foreign bodies within the lumen leading to early infection, infiltration, ulceration and gangrene. This etiological relationship appears verified by the numerous cases reported (Apolent, Kretz, Sonnenburg, Kelynack and Schnitzler), in which unusually severe attacks of appendicitis, resulting in abscess formation, have followed suppurative tonsilitis and in which the same streptococci were found in the appendix as in the tonsil.

As regards the bacteriology of appendicitis and perityphilitis, the greater number of investigations have shown that, as a rule, we are dealing with a mixed infection in which the most important organisms are the bacillus coli communis, the streptococcus pyogenes, the diplococcus pneumoniae and the anaerobes; while these forms are frequently found, especially in the more virulent types, other forms of bacteria may assume the major role.

I wish to note briefly a case of fulminating appendicitis in a sixteen-year-old boy, seen sixty hours after the first symptoms and operated upon two hours later, in which the distal half of the appendix was gangrenous, and at least 12 ounces of fluid evacuated from the general peritoneal cavity, in which the predominating organism was streptococcus. The pus was mopped out with sponges, the cavity drained with cigarette drains and after an uneventful recovery, he left the hospital in three and one-half weeks.

It is now generally recognized that the pathogenic powers of bacteria are not determined exclusively by their individual virulence, but also, and possibly primarily, by the resisting powers of the organism and of the particular tissue invaded by the bacteria.

It appears that in the vermiform appendix the various factors which intensify the pathogenic power of the invading bacteria are present; some of these factors have a tendency to increase the virulence of the bacteria, others to lower the resisting powers of the tissues, while in some instances both of these factors may be at work at the same time. While difficult to prove, it seems highly probable that the appendix, with its numerous follicles, is a convenient point of entry for microorganisms, and thus resembles the tonsils which are also rich in lymphatic tissue.

DIAGNOSIS.—We now come in contact with one of the most complex problems of modern surgery. First, we have before us an individual entity who, in all probability, has little or no power of interpreting the special symptoms of the complex group from which he may be a sufferer; second, because of his age he cannot be made to understand that it is of prime importance to aid the diagnostician rather than hinder him by crying, restlessness, and a general rigidity which almost invariably predominates in the young.

Again the severe, diffuse variety is commoner than the simple catarrhal, or the latter may rapidly pass into the former, and our first realization of the serious trouble at hand be the presence of a general or localized peritonitis.

Let us now recall the classical and less constant findings in our adult cases and briefly treat of them in the order of their seeming importance as applied to appendicitis in infancy and childhood, bearing in mind the differences to be expected in the catarrhal, gangrenous or the perforative stages, respectively.

(1) *Spontaneous pain* manifested in the very young by fitful crying and sleep. In typical cases it is at first localized at "McBurney's point," but it soon becomes diffuse, radiating from the umbilicus into the pelvis. Young children complain of "belly ache," and usually lie curled up on one side. More rarely the pain may be referred to the right testicle or to the neck of the bladder, because of the close relation with the right ureter, a point which should be carefully borne in mind while operating. In rare instances we may have perforation before we get a history of pain. (Spieler.)

(2) *Hyperesthesia*.—Tenderness on pressure is apt to be difficult to localize in the young and therefore of little value.

(3) *Muscle spasm* or rigidity of the right rectus is present unusually early in children, but it is difficult to elicit and localize

because of the child's fear of examination, and its tendency toward rigidity of the abdominal muscles in general. Its elicitation is one of our most valuable diagnostic aids and is a fitting reward after a gentle and patient examination.

These three symptoms, when associated with vomiting and constipation, make a positive diagnosis possible in at least a majority of cases of older children, but in infancy and early childhood the diagnosis becomes far more difficult, because of the tendencies of the child to evade examination and it becomes necessary to look for further aid.

(4) *Nausea and vomiting* are usually present a short time after the onset of pain; they usually cease as soon as the stomach is empty but reappear in the later stages of the disease, when perforation has occurred, an abscess formed, or an intestinal paresis exists.

(5) *Chill*.—Rarely seen in the first stage.

(6) *Pulse*.—In simple cases the pulse usually corresponds with considerable regularity to the temperature, even more so in children than in adults; also as long as the process remains localized when extensive peritonitis exists the pulse becomes rapid and weak, easily compressible and irregular in character.

(7) *Temperature* is unreliable, as the worst types may run their course without any great rise of temperature and we may easily have a distinct fall of temperature after perforation and beginning peritonitis. Rectal temperatures only are reliable.

(8) *Constipation* is the rule in these cases. Diarrhea may be present, and the latter cases as a group are less urgent than those associated with constipation, whose early occurrence usually indicates intestinal paresis. The absence of blood, bloody mucus, etc., are important because of their predominance in intussusception.

(9) *Tympanites* with gradually increasing persistent abdominal distension is usually a later development.

(10) *Flexion of the thigh*, which is usually well brought out by attempts at extension and flexion of the two thighs.

(11) *Unconscious tendency to place the hands in the region of the appendix* to prevent examination of the sensitive area, which, unfortunately, is not always located in the classical region, is of frequent enough occurrence to be of diagnostic value.

(12) *Rectal palpation*.—In older children whose attention can be claimed, this method of examination is of prime impor-

tance. In catarrhal cases I have several times been able to locate the point of greatest pain with accuracy and not infrequently the outline of the inflamed appendix can be palpated through the thin rectal wall in these small pelves. In later stages its value for locating localized abscesses or intraperitoneal pressure is of inestimable value.

(13) *Tumor by abdominal palpation*, if the illness is of several days' duration, associated with a septic temperature, rigor, leukocytosis, etc., should always lead to the consideration of appendicitis.

(14) *Increased frequency of micturition* due probably to the close proximity of the right ureter and bladder to the area of inflammation.

(15) *Leukocyte Count*.—As a rule in children it is not as valuable as in adults, because of the great range under normal conditions, going to 20,000 or even higher. Probably the most reliable finding is a decided leukopenia of 5,000 to 8,000 in the presence of peritoneal involvement, which indicates either a low resistance or a preponderance of the infection over the natural resistance and is always an evil omen. Probably more important than a simple increase will be a differential count when better understood. Gundobin estimates that in infancy polymorphonuclear cells average 34.0 per cent., mononuclear lymphocytes 59 per cent. and transitional forms 6.4 per cent., while in later childhood the polymorphonuclears increase more nearly to the normal. Remembering these characteristics a leukocyte count of 30,000 or more, with 80 per cent. polymorphonuclear cells, or 15,000 with 90 per cent. polymorphonuclear cells, should always lead to the suspicion of the presence of pus. In intestinal obstruction the leukocytes number even 50-80,000 which must not be forgotten. In all cases the accompanying findings must be considered.

(16) *Iodophilia test* which in the presence of pus has some claim to recognition. My own experience with it has not been entirely satisfactory. Although the laboratory findings are of considerable value in the diagnosis of atypical cases, and aid in the prognosis of the most virulent types, they should not, except in rare instances, be allowed to set the time of operation. Therefore, to be of value, we should (1) Count the number of leukocytes. (2) Make a differential count; remembering the difference between the normal infants and adult count. (3) Stain the blood film by special methods. Iodin reaction, etc.

(17) *History of previous indefinite attacks of abdominal pain* associated with a tendency to persist, and a slow retrogression of the group of indefinite symptoms, is of vast importance and the history should always secure careful consideration.

DIFFERENTIAL DIAGNOSIS.—The surgeon is only too rarely called upon to treat a simple case of inflammation of the vermiform appendix in early childhood; and as the acute initial symptoms may be followed very quickly by the signs of a diffuse infective peritonitis, it becomes necessary for the diagnostician to be well acquainted with the disease in all its forms. The signs of perforation may become manifest after the first defecation, whether it be spontaneous or produced by an enema. It has been my unfortunate experience on several occasions to be called after many hours or days of delay spent in fruitless attempts to relieve "belly-ache," and on two occasions the time of perforation could be definitely ascertained by a history of sudden cessation of pain after a short, sharp paroxysm.

The conditions with which we are most likely to come in contact and which will necessitate consideration after differentiation are probably as follows:—

(1) *Colic*.—This is distinguished by the absence of localized tenderness and fever, by its short duration, and by the fact that the pain is generally less intense. Severe colic in older children should, however, always be regarded with suspicion.

(2) *Indigestion*.—From acute indigestion the diagnosis is often difficult at the onset and may be impossible for twenty-four hours. The pain is usually less severe, but the temperature is higher. The pain is not usually localized, and if so, it is more apt to be in the epigastrium or umbilicus. But the same may be true of appendicitis and in the presence of pain, vomiting, localized tenderness, and severe constitutional symptoms, appendicitis is never to be lost sight of. With the former, diarrhea is the more frequent, while in appendicitis the reverse is true.

(3) *Intussusception* in infants without a palpable tumor requires a great deal of care in differentiation, otherwise an error may be made. With a proper examination and history in a typical case the diagnosis is not difficult. Pain, colic, and vomiting are intense and severe from the time of onset. Bloody stools and tenesmus are almost constant. Temperature shows little or no elevation at the onset; and in the presence of a typical tumor palpable through a more or less lax abdominal wall only moderately

hyperesthetic, our diagnosis should be complete. This was well illustrated by a case which I operated upon this afternoon, in which there existed a highly edematous tumor of twenty-nine hours' standing, involving over thirty inches of intestine and in which case the child seemed to suffer a minimum of pain upon deep abdominal palpation, allowing the same to be made without crying or resistance.

(4) *Acute Intestinal Obstruction*.—Its onset is more abrupt, pain of severer type, remissive in character, and referred frequently, though not always, to the seat of obstruction. There are absolute constipation and suppression of flatus, with early and persistent vomiting, soon becoming fecal, a condition rarely occurring except in the later stages of appendicitis. Shock and collapse appear earlier in obstruction than in appendicitis.

(5) *Psoitis*.—Usually of traumatic origin and associated with a deformity due to retraction of the thigh, but is rarely accompanied by the typical findings of appendicitis and more frequently taken for a Pott's disease.

(6) *Pott's Disease*.—The absence of intestinal symptoms, curving of the lumbar spine, when the limb is brought into a fully extended position, the characteristic deformity, inability to execute the normal movements of the joint, and pain referred to the knee, are sufficient to characterize the disease of the hip-joint.

(7) *Renal Colic*.—Usually ushered in by a chill, and the excruciating pain is more perceptible posteriorly than anteriorly; and radiates along the course of the ureter into the ovary or testicle, and is diminished by the voiding of urine. There is usually absence of temperature, abdominal rigidity and localized pain in the right iliac fossa. Blood is frequently found in the urine.

(8) *Biliary Colic*.—Fever is absent in uncomplicated cases, history frequently of previous attacks accompanied by jaundice, clay-colored stools, and higher location of seat of pain with frequently a radiation upward and posteriorly to the scapula are all points of differentiation.

(9) *Perityphilitic or Perinephritic Abscess*.—They may be secondary to appendicitis, the abscess taking this course rather than a peritonitis and the pus may then track up the back for a considerable distance where it may be opened in the loin. In primary cases of the latter there is rarely disturbance of intestinal function.

(10) *Pneumonia and Pleurisy.*—Both present a tendency on the part of the child to refer to the abdomen the pain really felt in the chest. Associated with this pain are constipation and abdominal tenderness, with distension; symptoms which commonly usher in an attack of pneumonia and early produce a clinical picture simulating appendicitis. Differentiation is usually possible by carefully noting the history of (1) a sudden rise of temperature to 103° F., or thereabouts, and the tendency to maintain this degree with usually a preceding history of chill or convulsions; (2) the acceleration of respiration which is out of proportion to the pulse rate or the pyrexia; (3) the relaxation of the abdominal walls between respirations; (4) the disappearance or diminution of tenderness on deep pressure with the flat of the hand; (5) the possible presence of cough. No operation for appendicitis should be undertaken until after careful and repeated examination of the lungs has been made.

(11) Tuberculous peritonitis must be considered in differentiating the more chronic forms. The clinical history, physical findings other than abdominal lesions and early ascites and progressive course, make differentiation after prolonged observation in most cases possible.

(12) *Incipient Inguinal Hernia.*—It is usually not accompanied by a rise in temperature or abdominal rigidity. Examination of the hernial orifices should be made in all suspected cases of appendicitis.

(13) *Typhoid Fever.*—A Widal reaction is of great assistance as are also the absence of the usual physical findings and low leukocyte count. The most difficult complication to differentiate is a perforating ulcer in an ambulatory typhoid case.

(14) *Infection of Meckel's Diverticulum.*—Very rare except early when still attached to the umbilicus, when the infection and distension show themselves in the scar of the cord. The same may be said of a patent urachus.

(15) *Torsion of the Cord of an Undescended Testicle.*—A case of torsion of the cord of an undescended, right-sided testicle, which I recently saw in consultation, presented many of the findings of intestinal obstruction, but upon careful examination the true condition became apparent and was confirmed and operated.

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Subcutaneous Feeding in Surgery.—Friedrich's later experiences (*Berliner Klin. Woch.*, XLI., No. 16) have fully confirmed his previous announcements in regard to the great value of subcutaneous feeding in certain severe gastrointestinal disturbances, in which feeding by the mouth or rectum and also a fistula are contraindicated. His technic is the daily injection of 40 to 100 gms. of grape sugar in a 3, 4 or 5 per cent. solution. He also uses a pure pepsin-peptone, free from albumoses (the chemically pure product being made according to the method devised by Professor Siegfried of the Leipsic Physiologic Institute). Twenty grams of this combination injected subcutaneously are completely utilized by the organism. He gives it in a 7 per cent. solution, with or without the grape sugar. An admirable combination is .2 gm. table salt; 2 g. grape sugar and 4 gm. pepsin-peptone to the 100 gm. water. With this subcutaneous nourishment he has been able to tide patients past the critical period of perforation of the stomach or bowel, or severe peritonitis from any cause.—*Journal of the American Medical Association.*

TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS.

BY FRANCIS HUBER, M.D.,

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Osler defines cerebrospinal fever as "an infectious disease, occurring sporadically and in epidemics, caused by the diplococcus intracellularis, characterized by inflammation of the cerebrospinal meninges and a clinical course of great irregularity." In discussing the treatment, and in estimating the success of any plan, the great irregularity in the clinical course, the grave character of the anatomical changes and the large proportion of fulminant cases (against which we are absolutely powerless) must not be lost sight of.

In the absence of any specific remedy or antitoxin and our inability to jugulate the affection at the onset, the treatment is necessarily empirical and symptomatic. It is to be sincerely hoped that ere long, when various obscure points are better understood, *preventive measures* rather than drugs will clear the field and counteract the invasion of the germ. While these preventive measures are matters for the sanitarian and the Department of Health the individual should not neglect his efforts. Improved hygienic conditions with plenty of sunlight tend to lessen the danger of contracting the malady. As a prophylactic measure, the intranasal employment of germicides has been suggested in a recent editorial in the *New York Medical Journal*, March 25, 1905, page 602. This is nothing new, Jacobi has advocated such procedures for scores of years as a preventive. Caillé's many eloquent appeals have done much to popularize the method of nasal toilet.

Preventive and prophylactic measures thus far have not been crowned with any degree of success. As stated above, the treatment is symptomatic. The mortality in different years varies within wide limits. At present it is about 65 to 70 per cent. In studying the various methods, no great differences in results are noticed.

In the very acute cases of the *fulminant* type, where upon autopsy little more than intense hyperemia of the meninges and cortex is found, death is the result of a profound toxemia. No remedy thus far employed is of any service in this variety.

The onset of the disease, stormy or otherwise, does not enable the practitioner to forecast the subsequent course. The attack may be ushered in with severe symptoms, which in a few fortunate instances subside in a few days or a week and the subsequent convalescence is rapid. Nature and not our remedies works the cure in this type. Such cases belong to the *aborted or mild type*.

In other cases the irregular and variable course leaves us in doubt as to the value of treatment. Exacerbations and remissions are frequent; unexpectedly a recrudescence or relapse will follow a short period of improvement. Each case must be judged by itself. *The strength of the patient must be maintained by proper nourishment and skilled nursing.* Nourishment and nursing are of the utmost importance, particularly in the protracted cases. In other words, the fighting power of the body must be increased to resist the germ.

In private practice the patient should be isolated and placed in charge of a trained nurse, to secure the necessary rest of mind and body. The room should be well-ventilated and dark, or perhaps a bandage might be placed over the patient's eyes. The head and neck are to be carefully supported; at times raising the head of the bed six or eight inches seems to add to the comfort of the sufferer. The functions of the body must be regulated, and the bowels kept open. In the beginning the catheter may be required. Plenty of water to drink and fluid diet are advised. The ordinary rules applicable to nursing of serious febrile cases should be carried out. The nasopharynx, so frequently the seat of trouble, ought not to be neglected, but should be irrigated. Warm salt solution ($\frac{6}{10}$ of 1 per cent.) slowly poured into the nose with a spoon will improve the breathing and prevent the dry mouth and tongue to a considerable extent. During the early stages when swallowing is difficult from a paretic condition of the pharynx and later on in bad cases, forced feeding through nose or mouth may be required.

The usual general recommendations were followed in our cases both hospital and private. Cold applications to the head, ice-bags, etc., were employed as routine measures. The temperature, when above 103° F. was reduced by means of colon irrigations at 80° F., or mustard packs repeated every three, four or six hours as required.

Local abstraction of blood was not adopted. Many of our

patients had been leeches without much apparent benefit, before they were sent to the hospital. Ergot has been extensively used and highly vaunted, particularly in the early stages. Bromids have been advocated by many authors; they are inferior in their effects to the opium derivatives. Phenacetin with or without codein gave relief to the headache and general pains. In others, codein or morphin by mouth or hypodermically was resorted to to relieve the restlessness and suffering. Iodids, so strongly recommended by various authorities, were given as a routine plan.

Various applications have been made to the spine, including Credé or mercurial ointment, without apparent benefit. In order to relieve the intracranial pressure, lumbar puncture was resorted to, with temporary benefit. It may be necessary, particularly in the chronic cases, to repeat the procedure at stated intervals upon the return of symptoms.

In a few cases, lysol injections were made, with but indifferent results. Warm baths at 95° F., given in the later stages, seemed to add to the patient's comfort and quickly relieved the contractions of the extremities and rigid condition generally. Sleep was secured in many instances.

The method of Aufrecht, initiated by him in 1894, has been followed by recoveries in two-thirds of the cases treated by Rogansky. Hot baths at 104° F. are given once or twice daily, an ice-bag being applied to the head. It is claimed that by these means consciousness is restored, the nervous system quieted and sleep is induced. The plan seems to be worthy of further trial.

A few words only regarding antitoxin treatment:—"That branch of bacteriology which deals with the mutual antagonistic relations of pathogenic germs is still in its infancy. The facts already discovered suggest important developments in the future. To what extent clinicians will be able to utilize these antagonisms in the treatment of disease it is difficult to foretell." (*Medical News*, March 4, 1905.)

A further contribution to the subject and one which induced Dr. Waitzfelder and other clinicians to resort to diphtheria antitoxin in treating cerebrospinal meningitis was made by Dr. A. J. Wolff, of Hartford. He early found that there is a decided antagonism between the Klebs-Löffler bacillus and the meningococcus, and during the course of study on this portion of the investigation found that pure cultures of the meningococcus were killed by the antidiphtheritic serum, and not only precipitated when

mixed with the latter, but active bouillon cultures, when mixed in bulk with the antitoxin, are precipitated in the same manner.

The high expectations founded upon the laboratory experiments were unfortunately not realized, and the procedure after a careful trial was soon abandoned at Roosevelt and Beth Israel Hospitals. Even the intraspinal injections have not yielded better results.

An interesting contribution is the following:—A little girl, three years and nine months old, previously healthy and in good physical condition, was given an immunizing dose (a suspected case of diphtheria having occurred in the same family), of 2,000 units at 2 P.M. The next day at 10 A.M. she was suddenly taken ill, became rigid, lost consciousness and vomited a number of times. When seen in consultation at four o'clock, she was in deep coma, pulse imperceptible, numerous petechiæ over body and face, had vomited large quantity of grumous material. Subsequently "tarry stools." Large tracheal râles and evidences of pulmonary edema made us give a bad prognosis. Death, 8 P.M., due to malignant cerebrospinal fever.

In conclusion, I would quote from my paper in the Gouverneur Hospital Reports for 1904, as follows:—"A careful consideration of the cause and a study of the pathological lesions, lead to the belief, that in future, preventive measures rather than remedial agents, will overcome the dangers of the greatly dreaded epidemic cerebrospinal meningitis."

Appendicular Pain in the Pneumonia of Children.—Cavatorti (*Gazzetta degli Osped. e. Clin.*, February 28, 1904) reports the case of a girl aged ten years, who was seized with all the symptoms of appendicitis, and two days later developed pneumonia. During the pneumonia the pain did not disappear entirely, and some of it remained even after the pneumonic processes had resolved. Prandi thought that, in a similar case recently reported by him, the abdominal symptoms were due to ordinary intestinal disturbances which are so common in children. Cavatorti, on the other hand, thinks that in the present case the pain and other signs were too clearly localized and persisted too long to be considered due to mere temporary disturbances of the intestines. He considers them due to the specific germ of pneumonia, the bacillus of Fraenkel. In other words, there was an appendicitis due to the same germs that produced the inflammation of the lungs. There were two distinct diseases caused by the same microorganisms.—*New York and Philadelphia Medical Journal.*

INTRAUTERINE AMPUTATIONS AND AMNIOTIC BANDS.*

BY WILLIAM LELAND STOWELL, M.D.,
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Edward N., the subject of the accompanying photograph, is twenty months old. As he is an abandoned infant in the hospital, no history of his birth is obtainable. He is a mentally bright, well-nourished boy, with deformities as follows:—From the right hand the distal phalanx of the index finger is absent; of the middle finger only the first phalanx remains; the ring finger is amputated through the first phalanx, and the little finger has a deep, double groove about the first phalanx constricting the soft parts nearly to the bone.

The left hand has all the fingers partly webbed together, none of normal length, the third and fourth having constrictions that leave the ends like small knobs. The second finger on this hand is also contracted toward the palm. As the thumbs are both normal the child uses the hands freely to grasp his food and toys, or to pinch himself as seen in the photograph. (See Figure I.) The lower extremities have no amputations, but are grooved and deformed otherwise.

The right leg presents a circular groove at the lower third directed obliquely from within downward and outward. It is not deep, but very distinct.

The left leg presents a little below the knee a deep groove with sharply-defined edges. On this left side there is marked talipes varus. The great toe is normal and free, but the others are heavily webbed almost to their tips, the second and third being especially together and the fourth bound to the fifth. These marks and changes are clearly defined in the accompanying photograph.

While teratology may have little practical value it is a field most interesting to study. Prenatal amputations of all or a part of a limb, or several amputations have been recorded from early centuries. During recent years descriptions are more full and cases more authentic than of old.

In 1839 Montgomery described a five months' fetus having a

* Presented before the Pediatric Section of the New York Academy of Medicine, April 12, 1905.

misshapen head and with hands undeveloped, and showing distinct fine cords or threads from the ends of the fingers to and around the ankles, dividing them two-thirds through. The illustration shown in his article is remarkably like the case here presented.

The left foot or leg is so often the one affected that there must be a reason, not accident. Montgomery recorded a case of first labor in which the child was born minus the left foot, and the foot was found in the uterus, both stumps being nearly healed.

Fitch's case was one in which there was a discharge of liquor amnii, with a foot on one date, but in which the child was not born until eighteen days later. The "amputated limb was nearly healed."



FIG. I. CASE OF INTRAUTERINE AMPUTATIONS AND CONSTRICTIONS.

Cases of this character occur once in 3,000 or 4,000 births. Various causes have been given for these cases; especially attention has been directed to heredity and traumatism, of which the following are cases in point.

Heredity.—A man was wounded in the right arm in 1865. Ten months after the wound had perfectly recovered he had a son born with intrauterine amputation at the upper third of the right arm.

Traumatism, as where a pregnant woman fell, causing fracture of a bone in the child with subsequent atrophy.

Menzel says there is a "change in the epidermis, a proliferation and downward growth of surface epithelium." Montgomery considered the bands organized lymph, while Gurlt regarded "these threads as prolongations of the egg membrane from which the fetus grows." Ballantyne discards the amniotic band theory and says these deformities are of embryonal origin. Cases are reported of grooves and malformations in the fetus, when found outside the amnion and possibly outside the chorion. Surely the *amniotic* bands were not factors in such instances. Raynaud considered the cases like ainhum, but that is an affection of the toes of adults in the tropics. Jeanne likens them to scleroderma, a trophic lesion.



FIG. II. CASE OF CONGENITAL ABSENCE OF BOTH THUMBS AND DISLOCATION OF ELBOWS.

Oligohydramnios, *i.e.*, deficiency of amniotic fluid, causes talipes, amputations or deformities (Edgar). Our case may come under this classification, because of the club-foot. Inflammation of the amnion may occur with plastic exudate, forming bands connecting the fetus and amnion. These bands have no blood supply,

therefore, contract rather than grow. Wolf's case (1900) shows such a threadlike cord from the fingers to the placenta. One case shows such small cords extending from the ends of the fingers to and around the ankle, not attaching to the amnion. It is not easy to understand why the cords should so tightly surround a limb and so rarely be oblique or unequal, or press upon the trunk. Other records and illustrations represent very wide bands attaching the head or other parts to the placenta.

For a long time the umbilical cord was credited with these deformities. The funis has been found in grooves about the legs, but it is easy to suppose that it could readily become caught there rather than that it should cause the groove by continuous pressure in one line, the limb meanwhile growing normally in many cases. The funic theory must fail in our case as it is inconceivable that the cord could so press upon the fingers as to cause amputations at different levels.

Bennett dissected a woman having stump hands and digits, with grooves from pressure bands. The dissected ends of the nerves showed no neuromata as in surgical amputations. Brooks made similar dissections with like results. It seems, therefore, that not all these amputations are like those by a surgeon. If the amputation is accomplished before the third month there is no likelihood of finding the missing part.

I present also a photograph of a boy having congenital absence of both thumbs and dislocation of both elbows. The skin lesions are seborrhea. (See Figure II.)

We are driven after all to agree with Ballantyne, when he says that, as a matter of fact, we have no satisfactory explanation of these cases.

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GONOCOCCIC INFECTION OF THE EYE IN INFANTS.*

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Frequency.—Heim (*Die Blen. neonat. u.d. Verhütung*, Inaug. Dissert., Bern, 1895) collected statistics of 83,000 births with 400 cases of ophthalmia neonatorum, about 0.5 per cent. Of the 400 cases, 60 to 70 suffered some degree of permanent impairment of vision. Infection occurred in infants born in the city twice as frequently as in those born in the country, and among the lower classes much more frequently than among the well-to-do. Schatz (*Deutsch. Med. Woch.*, No. 1, 1884) found the same percentage as Heim, namely, 0.5 per cent., in 18,000 births. H. Cohn collected the statistics of 1,000 births in the city of Breslau in 1894, finding 2 to 2.5 per cent. of ophthalmia neonatorum, a percentage which corresponds with that of Widmark of Stockholm. In 80 per cent. of the cases reported by Heim and Cohn both eyes were affected.

The average percentage of cases occurring in patients treated for diseases of the eye at the New York Eye and Ear Infirmary during the last forty years was approximately 0.5 per cent. During the year ending October 1, 1904, 27,247 patients with diseases of the eye applied at the Infirmary for treatment. Of these 176, or about 0.62 per cent., were cases of ophthalmia neonatorum.

Mode of Infection.—The mode of infection is principally by the entrance of gonococcus-bearing secretion into the conjunctival sac of the infant from the vagina. The time and method of infection have been classified as primary and secondary; primary, occurring before or during the birth of the child; secondary, occurring after the birth of the child. The infection may take place before birth and not only the conjunctiva be implicated, but the cornea may be involved and perforation of the cornea of one or both eyes may already have taken place. Krukenberg (*Verhandl. d. Ges. f. Geburtschift u. Gynäk. zu Berlin Sitzung*, June 26, 1891) observed a case in which the conjunctivitis was well advanced and the cornea of the right eye was hazy when the child passed the vulva. Gonococci were found in the secretion from the conjunctiva. The fetal membranes had ruptured two days before the child was born. Parishew reports a case in which there was well-established ophthalmia neonatorum at birth and the corneæ were hazy. The membranes had ruptured and the amniotic fluid had escaped three days before the birth of the child. In these cases the gonococci undoubtedly found access to the eyes of the infant short-

* Read before the New York Academy of Medicine, Section on Pediatrics, March 2, 1905.

ly after rupture of the amniotic sac, and the period of incubation was sufficiently short to permit the development of the affection before birth. A number of similar cases have been reported.

Cases are reported which appear to show that infection can take place before the fetal membranes rupture. To explain such cases the theory is advanced that the gonococci find their way into the amniotic fluid from the blood-vessels of the mother by a process of transmigration. A case was reported by Armaignac at the French Ophthalmological Congress, 1902, as follows:—Three-quarters of an hour after the rupture of the membranes the child was born and two physicians stated that at the time of birth the child suffered from a well-marked purulent ophthalmia and purulent vulvitis. The corneæ were macerated. Armaignac saw the child ten days later, at which time both corneæ were perforated and lost by gonorrheal infection. He is of the opinion that the gonococci entered the blood and lymph vessels from a gonorrheal metritis and passed into the amniotic sac. Neiden (Graefes-Saemisch, Bd. V., 1 Abt., iv. Kap., p. 234, 2 Aufl.) observed a case of ophthalmia neonatorum at birth in which the child was born in the membranes.

During birth the eyes of the child remain for hours in contact with the secretions of the vagina. If the lids remain closed and bound together, no infection takes place, but, if from any cause the margins of the lids are separated even in the slightest degree, the contagious material may find entrance. When the child is washed for the first time the secretion that may be on the eyelids may readily find entrance to the conjunctival sac.

Time of Onset.—The affection of the conjunctiva appears in by far the greater number of cases during the first five days after birth. This is well set forth by the accompanying table of Uppenkamp (Inaug. Dissert., Berlin, 1885), in which he shows the time of occurrence in 328 cases.

Day - -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Cases -	16	38	80	58	54	29	20	15	5	6	1	1	2	1	1	0	1

The cases in which the appearance of ophthalmia, due to the gonococcus is early, represent the cases of ante-partum infection before and after rupture of the membranes, and of infection at birth by very virulent gonococci. Those occurring on the first day are frequently cases of retarded labor, the infection having occurred some hours at least before the child passed the vulva. In cases occurring later than the third day, the gonococci are as a

rule less virulent, the conjunctivitis less severe. It is probable that in many cases occurring after the fifth day, a very small number of the specific microorganisms, whose virulence has become attenuated, have entered the conjunctival sac at the time of birth and it has required a number of days for them to become sufficiently numerous to produce the conjunctivitis. The cases that appear late are, as a rule, very much less severe than those that occur early.

In regard to *secondary infection*; at any time pus from any source containing gonococci can, as in older children and adults, be conveyed to the conjunctiva of the infant. The contagium may be conveyed from a vaginitis or urethritis in child or adult. Conveyance by sponge, wash-cloths, towels, etc., is now of much less frequent occurrence than formerly, because those who assist at childbirth are better informed and better observe the rules of cleanliness.

It has been found by Welander that the gonococcus may be transferred from a patient suffering from gonorrhea to a healthy individual by flies, and that gonococci retain their vitality away from the human body for a long time if they do not become dry.

The gonococci attack the healthy conjunctiva. In the early stage of the conjunctivitis they lie on and between the superficial epithelial cells and may pierce the epithelial layer and pass into the subepithelial tissue. Saemisch (Graefe-Saemisch, 2 Bd. V., 2 Abt., p. 224) states that as a rule the gonococcus is not found deep in the subepithelial tissue. Wertheim (*Centralbl. f. Gynäk.*, No. 48, 1896) writes that in favorable cases the passage of the gonococcus deep into the tissues is not unusual, and Ahman (*Arch. f. Dermat. u. Syphilis*, Vol. XXXIX., Heft 3) has shown that the gonococci may pass into the blood-vessels from the subepithelial tissue. Dinkler (*Arch. f. Ophth.*, Vol. XXXIV., 3, S. 21) found in 2 cases that the gonococcus had penetrated the corneal epithelium, the *substantia propria* of the cornea, and was found in the iris tissue.

Affections of the cornea usually take place from the fifth to the fourteenth day. It is the opinion of Saemisch, Kalt, Chibat and others, that the gonococcus is not wholly responsible for the production of ulcers of the cornea, but that it is the indirect cause. It is suggested that the nutrition of the corneal epithelium is interfered with by the toxin of the gonococci, and that the staphylococci then find entrance and produce the loss of substance. In

a case in which the globe was enucleated after gonorrheal ulcer, examined by Dr. French (*New York Eye and Ear Infirmary Reports*, January, 1887), the gonococci were found as far back as the equator; they were few in number; many staphylococci were present.

Prophylaxis.—The prevention of gonorrheal infection in the newborn embodies two plans of treatment: one is to free the vagina of infectious muco-pus, which is accomplished to some degree by douching the vagina at the beginning and during the progress of labor with antiseptic and cleansing solutions. (The vaginal mucous membrane may be washed with soap and water and then with a solution of sublimate, 1-1,000, or douched with sublimate, 1-2,000.) In addition, the eyes of the child are carefully cleansed as soon after birth as is convenient with sterile water or with germicidal remedies to prevent the entrance of germ-laden secretion, or to destroy the microorganisms that are in the secretion that is on the eyelids.

The second procedure is calculated to destroy germs that have already entered the conjunctival sac. Scheiss-Gemuseus washed the conjunctival sac of the newborn with a solution of carbolic acid and with thymol; Hausman, with solutions of carbolic acid, and Kehrer with 1 per cent. nitrate of silver, in the endeavor to free the conjunctival sac of germs, but it was not until Credé (*Arch. f. Gynäk.*, Bd. XVII., p. 50, 1884) began the publication of his method and gave his results that much attention was paid to it. His method was briefly as follows:—As soon as possible after the umbilical cord was severed, the child's body and eyelids were carefully cleansed in the ordinary way; then the eyelids were gently separated; a glass rod, 3 mm. in diameter, smooth and round on the end, was dipped into a solution of nitrate of silver, 2 per cent., and the adhering drop brought into close proximity to the cornea and dropped on the cornea; the lids were permitted to close and nothing further was done. Slight swelling of the lids and some mucoid secretion sometimes followed, but there was seldom much reaction. Credé found that by this procedure the percentage of infections, which before its use had been from 2 to 50 per cent., was reduced to 0.6557 in 24,724 births which occurred in the institution of which he had charge.

It occurs from time to time that the 2 per cent. nitrate of silver used after the manner of Credé causes an inflammatory reaction that is quite alarming, and it is desirable that some equally effi-

cient remedy that will not cause such reaction should be found. Such a remedy we possess, I think, in argyrol, and I do not hesitate to advise its use in the strength of 25 to 35 per cent. after the manner advocated by Credé, in the use of the solution of silver nitrate.

Distilled water, carbolic acid in weak solution, thymol, salicylic acid, sublimate solution, permanganate of potash, boric acid, chlorin water, iodoform and protargol have all been employed for the purpose of cleansing the conjunctival sac, with results that have been more or less satisfactory.

In the opinion of the writer, prophylactic measures directed to the elimination of the gonococcus from the conjunctival sacs should be employed in every case of the birth of a viable child.

For the protection of the fellow eye, when but one eye is infected with the gonococcus, Fränkel advises the use of one drop of a 2 per cent. solution of nitrate of silver instilled after the manner of Credé into the conjunctival sac of the sound eye, and he states that he has never seen any reaction of moment follow. Fick (Graefe-Saemisch, 2, Vol. X., p. 121) substantiates Fränkel's statement. It is the custom at the Massachusetts Charitable Eye and Ear Hospital to seal up the sound eye with a covering of cotton coated with collodion.

Symptoms.—These may be alluded to but briefly. The conjunctiva becomes hyperemic, the lids swollen; a serous discharge appears which may be tinged with blood and bile pigment. The secretion soon becomes purulent. At the end of the third day a typical purulent ophthalmia is present. The discharge may be profuse, the conjunctiva greatly hypertrophied, and the lids greatly swollen. Pseudomembrane may develop. There is a great difference in the severity of the cases. The condition may be mistaken for diphtheria of the conjunctiva in the very severe cases and for mucopurulent conjunctivitis in the mild cases. A differential diagnosis is desirable. This can readily be made by a microscopic examination of the secretion.

Complications.—The complication most frequently encountered is ulcer of the cornea. The manner of the production of ulcer of the cornea has been alluded to. The extent of the ulceration varies greatly from the very small ulcer, which heals without impairment of vision, and the ulcer with small perforation, which sometimes leads to the formation of anterior pyramidal (anterior-polar) cataract, to the ulcer which causes complete loss

of the cornea. The remote effects of corneal ulcers are corneal cicatrices which may or may not include the iris, partial or complete staphyloma corneæ, and phthisis bulbi. The conjunctiva may become enormously hypertrophied and thrown into numerous elevations and folds. In the great majority of cases this hypertrophy subsides without leaving a trace, but at times partial loss of the conjunctiva takes place.

A complication that is relatively rare, but has been reported a number of times, is gonorrheal arthritis as a result of gonococcus infection of the conjunctiva in infants. The arthritis may occur from the fifth day to the fifth week after the commencement of the conjunctivitis. In 2 cases observed by the writer, one began about the end of the second week, and one at the end of the third week. In both cases the wrist was the first joint affected. Both wrists, the right elbow-joint, the knee- and ankle-joints were eventually involved in one case; in the other, one wrist and one knee-joint only were involved. Deutschmann (*Arch. f. Ophth.*, Vol. XXXVI., 4, S. 109) terms the condition "arthritis blenorhœica." He succeeded in 1 case in finding the gonococcus in the secretion from the joint as well as from the conjunctiva. Recovery takes place as in gonorrheal arthritis occurring in older individuals.

An unusual complication is stomatitis gonorrhœica. This is brought about either by the direct conveyance of the contagium by the hands of the infant from the eye to the mouth, or by the passage of the gonococcus by way of the tear passages to the mouth. The stomatitis heals readily.

Results.—If the case is recognized early and appropriate treatment instituted, there need be but a very small percentage of impairment or loss of vision. It is in the neglected cases almost exclusively that bad results occur. There are some very virulent infections and some cases occurring in emaciated, syphilitic and marasmatic infants that go on to loss of vision apparently in spite of the most careful treatment, but these are very few indeed; I think that I may say "less than 1 per cent." Unfortunately it happens that many cases are not brought to the notice of the physician sufficiently early, consequently the cases of grave impairment and total loss of vision as a result of gonococcus infection of the conjunctiva is not of very uncommon occurrence. Magnus (*Die Jugendblindheil*, Wiesbaden, 1886) collected 1,046 cases of blindness which occurred in the early years of life and of these 753 were

the result of ophthalmia neonatorum. Reinhardt, in 1876, reported regarding the cause of blindness among the inmates of twenty-two asylums for the blind in Germany. Of these 30 per cent. were due to gonorrheal ophthalmia in the newborn. Cohn, in 1896, found the percentage in the inmates of forty-five asylums for the blind in Germany and neighboring countries to be 19. "At the meeting of the American Ophthalmological Society in 1898 the report of the majority of the Committee on 'Resolutions Relating to the Purulent Ophthalmia of Infancy' stated, among other things, that 'out of about fifty thousand blind persons in the United States a little over five thousand have lost their sight from the ophthalmia of infancy'"—a little over 10 per cent.

Treatment.—This consists in first keeping the eyes as free from secretion as possible by gently irrigating the conjunctival sacs with a 3 per cent. sterile solution of boric acid, or other bland antiseptic solution. The irrigation should be performed every half-hour or less often, according to the copiousness of the discharge. Second, some remedy destructive to the gonococcus, but not destructive to the tissue cell, should be introduced into the conjunctival sacs sufficiently often. The nitrate of silver is an old and valuable remedy. It may be employed in the strength of 1 per cent., applied thoroughly to the entire surface of the conjunctiva once daily while the secretion continues. After the secretion has virtually ceased, the strength of the solution may be reduced to 0.5 of 1 per cent., and the applications continued until the conjunctiva has very nearly reached a normal condition, when the nitrate of silver may be discontinued.

Protargol may be used in the strength of 10 to 15 per cent., dropped into the eye every two hours. When the secretion has almost ceased the protargol may be discontinued and the nitrate of silver, 0.5 per cent., be used once daily. The hypertrophy of the conjunctiva disappears more rapidly if this is done.

Argyrol, another albuminate of silver, is a most excellent remedy. It may be used in the strength of 15 to 35 per cent. (The stronger solutions should be used in severe cases.) A drop or two should be instilled into the conjunctival sac, after irrigation of the affected eye as advised above, every one or two hours, according to the severity of the case, until the secretion nearly ceases, when it may be used less frequently, and when the secretion has ceased the eyes may be treated with the boric-acid solution for a number of days until a normal condition of the conjunctiva is reached.

Clinical Memoranda.

REPORT OF A CASE OF PSEUDOHYPERTROPHIC MUSCULAR PARALYSIS.*

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The patient, Joseph N., aged fifteen years, was admitted on January 7, 1905, to the Philadelphia Orthopedic Hospital, in the service of Dr. William J. Taylor, to whom I am indebted for the privilege of reporting the case. The history is as follows:

Family History.—Father died at the age of twenty-five years from pneumonia. Mother is living and well. One other child, a sister, aged sixteen years, is living and well. No history of pseudohypertrophic muscular paralysis in family.

Personal History.—The child was born asphyxiated, after a difficult labor. As an infant he was always delicate. When four years old, glands, probably tubercular, were removed from the right side of his neck. Following an attack of measles, when five years old, the patient was ill for two years. His mother says he had consumption. (?) But previous to the measles the mother noticed that he was extremely weak in the lower extremities, and when walking, if given but the slightest jolt, would fall over. She also noticed that it was very difficult for him to rise from the ground; in fact, it was impossible for him to do so, unless he turned over on his abdomen, and pushed himself upward by his arms. Since that time, this weakness has increased steadily, until now he is scarcely able to walk, even on the level. Three years ago the patient was in the Children's Hospital, for about eight weeks. The diagnosis was made at that time of pseudohypertrophic muscular paralysis. While in the hospital he had a severe attack of pleurisy. He began to attend school when seven years old, but made very little progress, for five years he remained in the first grade. Although feeble, his mental processes are normal. He is able to read, and writes very well.

* Presented to the Philadelphia Pediatric Society, February 14, 1905.

Physical Examination.—The child's appearance is most striking. His station, gait, and muscular development leave no doubt as to the diagnosis. His general appearance is that of a child



FIG. I. CASE OF PSEUDOHYPERTROPHIC MUSCULAR PARALYSIS. PHOTOGRAPH SHOWING ATROPHY OF SCAPULAR MUSCLES, LORDOSIS AND ENLARGEMENT OF CALF MUSCLES.

about nine years old. His head is somewhat flattened antero-posteriorly. The pupils are equal, and react to light and distance. His teeth are in poor condition, and there is a scar on the right side of neck, below the angle of the jaw.

Over the entire body the skin has a mottled appearance, the hands are somewhat cyanotic, with slight clubbing of the fingers, and on the left arm there are scars of three successful vaccinations.

He is able to walk alone only with difficulty; he has the characteristic waddling gait, with feet far apart and toes turned in. He is able to stand alone only when his feet are widely separated. His station is typical, with a marked lordosis, but there is no lateral deviation of the spine. The boy has a rachitic chest with a tendency to a pigeon-breast, and beading of the ribs.

But the most striking feature is his muscular development; the enormous hypertrophy of the calf muscles, the soleus and gastrocnemius; the tibialis anticus is also hypertrophied. These

muscles on palpation are firm. The circumference of the mid-calf on right side is 29 cm., while on the left side it is 27½ cm. When the patient was in the Children's Hospital, three years ago,

the mid-calf measured $28\frac{1}{2}$ cm. There was no mention made whether this was the right or the left calf.

At present the circumference of the mid-thigh on the right side is $33\frac{1}{2}$ cm., and on the left 33 cm., while three years ago, the measurement was 32 cm. There is slight talipes equinus, the foot cannot be brought up more than a right angle.

The length of the right lower extremity, from the anterior superior spine of the ilium to the internal malleolus, is 67 cm., while the left lower extremity is one centimetre shorter, measuring 66 cm.

Both knees have complete flexion and extension.

The gluteal muscles are well developed, but not over developed; whereas the quadratus lumborum is over developed on both sides equally. The entire shoulder joint may be raised to the top of the ear, showing the marked wasting of the trapezius, latissimus dorsi, pectoral muscles, deltoid and scapular muscles, with the exception of the infraspinatus, which is hypertrophied. The muscles of the neck are not affected. The biceps and triceps are wasted, but wasting is not so marked in the forearms, where flexion, extension, pronation and supination are good. The hand muscles are fairly well preserved. Some slight wasting of the interosseous muscles and the thenar eminence.

The dynamometer shows very feeble power in the hands; slightly more strength in right hand than in the left.

The apex beat of the heart is one inch below the nipple, and just within the nipple line. The heart is not enlarged. A systolic



FIG. II. PSEUDOHYPERTROPHIC MUSCULAR PARALYSIS. PHOTOGRAPH SHOWING ENLARGEMENT OF POSTERIOR AND ANTERIOR LEG MUSCLES.

hemic murmur is audible. The liver and spleen are not enlarged.

The patient's average morning temperature is 99°F., and the afternoon temperature is 99.5°F. Average respiration is 24, and average pulse is 98. There is no albumin or sugar in the urine. The knee jerks are not diminished. Sensation is normal.

There are no reactions of degeneration in the arms or legs, and faradic response is good. Discussion will be found on page 384 of this issue of ARCHIVES OF PEDIATRICS.

Polymyositis in a Boy of Seven.—After recovery from whooping-cough the child had a fever for four days with dyspepsia and a fleeting exanthem, followed by symptoms of pronounced polymyositis. After persisting three weeks all the symptoms vanished and recovery was complete in eight weeks. Schüller (*Jahrb. für Kinderhk.*, Vol. LVIII., No. 1) compares with this the similar cases on record, with others of progressive ossifying myositis, etc. There are only 5 other cases of primary acute polymyositis in children—like his case—on record. One was of a fibrous type, one a dermatomyositis; one was consecutive to an infectious sore throat and one to some other infection. One child recovered completely in a few weeks, and one after a few months, but the others were left with paresis and atrophy of some of the muscles.—*Journal of the American Medical Association*.

A New Lactagogue.—J. A. Brink, observed (*Deutsche Woch.*, 1904, Vol. XXX., No. 207, p. 6), that the powdered extract of the cotton plant, was being employed by farmers with success in increasing the milk supply of their cows. By a series of control tests he found it to possess distinct lactogenic properties. It occurred to him to try it in nursing women, and as he reports with perfect success. Lactagol, the name he gives to the preparation of this character, is a fine yellowish powder of pleasant taste, insoluble in water, forming an emulsion with milk. Giving a heaping teaspoonful of it three times daily he noted the desired action usually in from three to four days, but sometimes the milk supply was increased on the first day. The details of 3 cases are given by him in full in which before taking lactagol nursing mothers were only able to feed their babies a part of the day, after taking it the whole day. He warns against giving it to women with atrophic breasts.—*Therapeutic Review*.

EYE STRAIN: A SUGGESTION AS TO THE CAUSE OF CYCLIC OR RECURRENT VOMITING.

BY DE WITT H. SHERMAN, M.D.,
Buffalo, N. Y.

At a recent meeting of the Academy of Medicine of Buffalo there was a discussion as to the causative factors of cyclic or recurrent vomiting. The different theories of acetonuria, hyperchlorhydria and various reflexes were discussed, but no mention was made of eye strain as a causative factor.

The following case is of interest in this last connection: A little lad, aged five, was brought to me about five years ago, healthy in every respect, but as was stated by the mother, with recurrent attacks of indigestion, which produced vomiting, followed by great prostration. They had recurred for a year or more, not oftener than at three months intervals, and sometimes, when his condition was particularly good, as after a summer holiday in the woods, the intervals would be longer, running up to six or eight months. The diagnosis of cyclic or recurrent vomiting was easy. The secretions were all studied. The hydrochloric acid in the vomit was excessive early in the attack. There was no constipation or other intestinal disturbance all the boy's functions, in fact, seeming normal.

The different diatheses were studied carefully; the different causes of toxemia, even including milk as a possible poison, were all considered. After a lapse of some time I had reached the end of my series of possible causes, and finally turned to the eyes, even though there were no symptoms that could be elicited. The boy was measured for glasses by Dr. Arthur G. Bennett, of Buffalo, who found that he had a hypermetropic astigmatism, both eyes being the same. The correction made was S. 50 — cyl. 75 — axis at 98. No loss of muscle balance. Spectacles were put on the boy, to be worn continuously from the time he awakened until he went to bed. He was in exceedingly good condition for about two months, when one day his mother noticed that dark rings had appeared under his eyes, which she had learned only too well was a forerunning symptom of an attack of vomiting. She put the boy to bed and kept him from food for a day. Since he was no better, I was called and found the boy depressed, nauseated, ready

to start to vomit, in spite of the fact that he had had nothing but sips of water for twenty-four hours. Examination of the glasses showed them to be awry. He was taken in a carriage to the oculist, the glasses were straightened, then he went home and was put to bed. No further treatment. In two hours the boy brightened up, his nausea left, he became hungry, he wanted to get up. He was allowed up, was given a good meal and went out to play. One year later Dr. Bennett examined his eyes again, the correction this time being:—Right, S. 50 — cyl. 75, axis at 90. Left, S. 75 — cyl. 50, axis at 90. These glasses he has worn since.

During the past two years there have been three or four threatening attacks, and when these earliest symptoms have appeared the boy has been taken at once to the oculist to have his glasses adjusted, and they have always been found in bad condition. This is one of the very few cases where the importance of eye strain in children has been satisfactorily proven. I have had the eyes measured and glasses worn in two other cases, one with partial success, the other without any. It may be said that this cause of eye strain would not apply to the cyclic vomiting of infants. That is possibly true, but I report it for the reason that it can easily be the cause of recurrent vomiting in children. I hope later to get accurate results from two or three cases which I now am studying. I am inclined to believe that hyperchlorhydria is a symptom of a neurosis, as in adults, rather than the real cause of the vomiting, and that, as in this case, there is a more remote causal factor operating.

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Polymyositis in Measles.—Jessen (*Berliner klin. Woch.*, August 8, 1904) reports a case of interest, in which a woman of thirty-two, who was taken ill with measles, developed on the sixteenth day a condition which was diagnosed as articular and muscular rheumatism, but later defined as an acute polymyositis. This was accompanied by a severe dermatitis. The patient made a very slow recovery. Such cases are rare and the etiology in this instance is of interest—no other cause could be assigned aside from the measles. Aside from instituting diaphoresis, the only remedy which had any effect was a 10 per cent. ichthargan ointment.—*Medical Record.*

A CASE OF MEASLES WITH AN UNUSUAL SEQUEL.

BY WILLIAM EDGAR DARNALL, A.M., M.D.,

and

MARY TOWNSEND, M.D.,

Atlantic City, N. J.

The case here reported is of unusual interest from the fact that after a careful search of pediatric literature I have been unable to find any mention of arthritis following measles; and, so far as I have been able to determine, this is the only such case recorded. The only author consulted who makes any allusion to such a condition is Moullin, in his *Treatise on Surgery*, p. 564 in the following statement:—"Variola, measles, dysentery and even mumps are in rare cases followed by arthritis." Dr. Townsend has kindly furnished the following history of the case up to the time I saw it in consultation with her:—

"M. G., female, aged eight months, breast-fed, well-developed and perfectly healthy since birth, January 29th, was found to have a temperature of 102° F., with pulse 130, coryza, redness of the conjunctivæ, photophobia, and a cough that was hard, dry and rather hoarse. All over the body was to be found the typical macular rash of measles and the Koplik spots on the buccal mucous membrane. In four days' time the rash had faded away, the temperature was normal, the child was apparently convalescent and the case was therefore discharged. After three or four days, at my next visit, the mother said that the child rested quietly as long as she was undisturbed, but would cry when taken up. On examination it was seen that she held both limbs stiff, and that both ankles and both knee joints were swollen and tender, but there was no redness. Any manipulation of them gave great pain. Temperature was 99° F., bowels regular and digestion good."

On February 14th I saw the case in consultation. The swelling had disappeared in the ankles and almost entirely in the left knee, but the right knee remained swollen and was apparently larger: the temperature was 100° F. There was no redness or local elevation of temperature, and the skin over the part was white, smooth and shining. The knee pan did not float, but there was distinct tenderness and pain if the patient was moved. At other times she would lie quiet and still. Fluctuation could be elicited through the joint. There had been no chills, sweating, muscle

spasm or run of septic temperature, and it was concluded on the part of both of us that we had a simple serous effusion of the joint, analogous to that occurring sometimes in the course of scarlet fever. Local depletants were ordered and the joint put on a splint for rest. In twenty-four hours the temperature was 99° F., the child less restless, but there was no perceptible change in the condition of the joint. The temperature remained at 99° F., until February 19th, when it rose to 102° F. There was even at this time no chills or sweating, but the child was quite restless. The temperature remained at 102° F. until February 23d, when it fell to 100° F. The joint was neither red nor hot and the child was apparently in no pain unless disturbed, but appeared paler. On February 24th, the skin about the joint took on that peculiar dusky red hue, and the knee presented the characteristic shape of a pus joint. As soon as this was noticed the joint was aspirated under strict aseptic precautions and about an ounce of pus withdrawn. Accordingly preparations were made for thoroughly opening and draining the joint, and this was done on February 26th. An incision was made on each side of the patella, and drainage tubes carried through the joint, emerging posteriorly, while a third tube drained the synovial pocket above the patella which does not always communicate with the joint. A large amount of pus was thus evacuated, and the joint thoroughly flushed out with normal salt solution. There was apparently no epiphysitis or other bone disease. There was at no time any enlargement of the lymph nodes, and no specific or tuberculous history in the family. The little patient succumbed a week after the operation, from exhaustion. It is to be regretted that an autopsy was denied, since the opportunity for a pathological study was thereby lost.

The absence at any time in the progress of the case of high temperature, chills, sweating and severe muscle spasms, which nearly always accompany severe joint infections, is rather extraordinary. It is clear that the effusion at first could not have been of a purulent nature, or there would have been from its beginning manifestations of local heat, redness, and an elevation of temperature with other septic symptoms; and it must be borne in mind that at first the other knee as well as both ankles were involved and the swelling subsided. Attention is directed to the fact that the temperature did not rise materially, from the time of the defervescence of the measles attack, on February 2d, until

February 19th, although the effusion existed from February 6th. Even after the 19th, when the joint was advancing from a serous to a purulent condition as manifested by the symptoms, the temperature was low for a child of this age with a severe infection. The question naturally arises that if the synovial membranes are infected in scarlet fever, giving rise to serous effusions which sometimes do go on to suppuration, why may not the same condition be true in a case of measles, or any other infectious disease where streptococci may be present?

In order to glean some light on the subject, I addressed a letter to several prominent pediatricists of wide experience, asking if such cases had occurred in their practice. I append some of the replies below:—

John Lovett Morse, Boston.—“I am sorry that I cannot help you in your investigation. I have never seen any swelling of the joints after measles and have consequently never seen any of them suppurate. I am sure that your case is well worth reporting.”

J. P. Crozer Griffith, Philadelphia.—“I would not like to say that I have never seen the inflammation of the joints in measles to which you refer, but I cannot recall having done so.”

Joseph E. Winters, New York.—“I have not observed any coincidence of swelling of the joints in conjunction with or following measles.”

A. Jacobi, New York.—“Angioneurotic edema enlargement is seen after infectious diseases, more after measles than others; still, as you give no particulars about pain, temperature, duration, etc., it is impossible for me to say what it was.”

Louis Starr, Philadelphia.—“I have not observed the symptom you mentioned as a sequel to measles.”

Henry E. Tuley, Louisville.—“I have never observed the complication of measles about which you make inquiry.”

W. P. Northrup, New York.—“I cannot recall a specific case of septic arthritis associated with measles, but I am sure it may occur. The tendency for chance organisms in the pharynx and tonsils to grow in the presence of measles and scarlet infection is coming to be more and more recognized.”

Thomas Morgan Rotch, Boston.—“I have not, so far as I can remember, met with any marked case of swelling of the joints following measles. I can very well see, however, how it might occur in the course of any infectious disease.”

ARCHIVES OF PEDIATRICS.

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TUBERCULOSIS OF THE NERVOUS SYSTEM.

Tuberculous affections of the nervous system are not uncommon in adults. In children they occur with less frequency, due to the fact that the course of the disease in children is much more rapid than that seen in the adult. The conditions most frequently met with in children are acute affections of the meninges and tuberculous tumors. Tuberculous meningitis varies greatly in its pathological and clinical manifestations. In some cases the inflammatory condition of the meninges is acute and fulminating, while in others it is subacute or chronic. In the acute type, the membranes at the base of the brain are reddened and lustreless and minute tubercles are found only after a careful search in the course of the cortical vessels. In the most severe cases of this

form, hemorrhagic extravasation is seen in the distribution of the vessels in the pons and the medulla. The inflammation extends along the bloodvessels and leads to rupture. Cases of this type not infrequently terminate within two or three days. Eichhorst mentions cases running their course in seventy-two hours. In the subacute and chronic forms, the inflammatory condition of the meninges may be a simple inflammation with a slight exudate, or the exudate may be semipuriform, matting together the tissues at the base of the brain, compressing the cranial nerves and sometimes reaching one-eighth to one-fourth of an inch in thickness. Cases of this type run a much longer course, with a slight fever and with a clinical picture depending to a certain extent on the distribution of the exudate at the base of the brain. The internal hydrocephalus which is observed in practically all of the acute and subacute cases of tuberculous meningitis, has been considered to be due to a blocking up of the foramen of Magendie at the base of the brain, but in most cases this will be found patent and the communication between the ventricular areas and the subarachnoid spaces will be found free. The internal hydrocephalus is in all probability of vascular origin, depending upon the effects of toxins, and has no connection with the interference in the ventricular fluid circulation. The most serious symptoms of tuberculous meningitis are undoubtedly due to the pressure exerted by the accumulation of the fluid in the ventricles. In cases showing serious clinical manifestations, a careful search will reveal comparatively few minute tubercles along the course of the vessels, and the lesions can in no way explain the disturbance of cerebral function and the severity of the course of the disease. The presence of tubercle bacilli in the cerebrospinal fluid obtained by lumbar puncture, in practically every case, where the proper technique is used, is evidence of an active process in the lymph circulation, other than the local inflammatory process of the meninges.

Tuberculous tumors are undoubtedly the most frequent of the intracranial tumors found in children. These tumors may be single or multiple, and sometimes go on to a spontaneous healing

without operation. The tumors are usually of an infiltrating type, with a pseudocapsule and sometimes with a real capsule. In either event, operation, when they are localized, is justifiable. It should not be forgotten, however, that even with a tuberculous process in the lungs the cerebral tumor may not be tuberculous but sarcomatous. Such a case recently came under observation.

Tuberculosis of the spinal cord in children is most frequently due to tuberculosis of the bones of the spine. The paralysis associated with Pott's disease may be due to direct pressure of the narrowed bony canal, with a local lymph stasis of the cord, or to the pressure exerted by an inflammatory thickening of the dura (external pachymeningitis), or to a proliferative tuberculous process of the piaarachnoid (internal pachymeningitis), to an infiltrating myelitis, and rarely to a rupture of an abscess of the bodies of the vertebræ, directly into the spinal cord. In the latter case the paralysis develops suddenly with minor symptoms referable to the bone. The thing which should be recognized in dealing with Pott's disease and the resulting nervous complications is, that several conditions within the spinal canal may obtain, entirely different in their nature. The simple pressure of the spinal cord, due to narrowing of the canal, is not so serious as when a condition of marked external or internal pachymeningitis exists. With the latter, especially in internal pachymeningitis, an active myelitis may be produced, which does not differ essentially in its nature from other forms of myelitis. Myelomalacia, due to involvement of the bloodvessels of the tuberculous or irritative process, is a condition of degenerative softening due to cutting off of the blood supply. In cases where an abscess ruptures into the spinal cord, there is complete destruction of spinal tissue with hemorrhage.

In children born of a tuberculous mother in the last stages of the disease, there are not infrequently present defective stability, lack of control, as manifested by hysterical and neurasthenic states, and especially a tendency to drug habits, alcoholism, etc. This fact should be recognized and special care used in the training and educating of such children.

D. J. McCARTHY.

Bibliography.

The American Year-Book of Medicine and Surgery for 1905. A Yearly Digest of Scientific Progress and Authoritative Opinion in all branches of Medicine and Surgery. Edited by **George M. Gould, A.M., M.D.** In two volumes. Volume I., General Medicine. Illustrated. Pp. 701. Philadelphia and London: W. B. Saunders & Co., 1905. Price, per volume, cloth, \$3.00 net.

Dr. Gould has associated with him a staff of sixteen physicians who, in this neat compendium of the advances of the past year, place before the practitioner a succinct review of the literature of medicine. Drs. Griffith and Gittings give a carefully sifted *résumé* of the contributions of the principal writers on subjects relating to children. Although there is nothing striking to record, there is added information under the headings of infant feeding, infectious diseases, constitutional diseases, development and diseases of the nervous system. The index is complete and the handy size of the volume makes it most suitable for reference.

Progressive Medicine. Vol. I. March, 1905. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by **Hobart Amory Hare, M.D.**, assisted by **H. R. M. Landis, M.D.** Illustrated. Pp. vi.-298. Philadelphia and New York: Lea Brothers & Co. Price, per annum, cloth, \$9.00; paper, \$6.00.

This well-known quarterly needs only a mention of its merits. Crandall opens the section on diseases of children by a review of the literature of hemorrhagic diseases of the newborn, septic infection of the newborn, ophthalmia neonatorum and umbilical cord hernia. Freeman's observations on rachitis are used as the basis of a careful consideration of the writings on the subject up

to the present time. Unfortunately, we are, as to a definite causative factor, still completely in the dark.

Preble's reviews of the infectious diseases belong, in many ways, to the pediatric section; for example: scarlet fever, measles and whooping-cough.

The surgery of the head, neck and thorax, laryngology and rhinology and otology have proper space allotted to them.

The Surgical Treatment of Bright's Disease. By **George M Edebohls, A.M., M.D., LL.D.**, Professor of the Diseases of Women in the New York Post-Graduate Medical School and Hospital, etc. New York: Frank F. Lisecki. 1904, pp. 327. Price, \$2 co.

This work represents a thorough consideration of the subject of operative interference in chronic nephritis by the originator of this method; he at the same time being the surgeon having, in all probability, the greatest experience. The comparative success in the author's cases is so great that it seems hard to understand why this operation is so little used by many members of the surgical profession, provided their experience was approximately as favorable as that of Dr. Edebohls.

The early chapters are devoted to a consideration of the types of Bright's disease, in which this method is indicated according to the author's views. The latter half of the book is devoted to case histories, of which 72 are given. Of the 72, 7 died within two weeks following the operation, making the death rate of 9.7 per cent.; 22 died at periods more or less removed from operation. Of the 43 remaining, the result is unknown after a period of three weeks in 3 cases; unimproved in 3 cases; improved in 20 cases and cured in 17. All of the patients operated upon were adults, with the exception of 1 case—a girl four and one-half years of age. This child had shown signs of chronic Bright's disease for two and one-half years prior to her operation. Decapsulation of both kidneys was followed by complete cure. The child had had measles at two years and suffered from more or less extensive burns shortly after. The clinical data available bearing upon the operative treatment of chronic Bright's disease

in children are very scant and, from a pediatric standpoint, more information upon this subject would be extremely welcome. The familiarity of surgeons with the success of operative treatment in chronic Bright's disease makes it unnecessary to go into the cases more in detail.

The book is attractively gotten up and the chapters well arranged. The cases are clearly reported, and at the end one finds a synopsis of the author's cases, a chapter devoted to his conclusions and an extensive bibliography.

A Treatise on Obstetrics, for Students and Practitioners. By **Edward P. Davis, A.M., M.D.**, Professor of Obstetrics in the Jefferson Medical College and in the Philadelphia Polyclinic, etc. Second edition Philadelphia and New York: Lea Brothers & Co. 1904, pp. 809. Price, \$5.00.

This very readable Treatise on Obstetrics contains a valuable chapter of eighty pages on Infancy. The section headings are:—The Physiology of Infancy, the Pathology of the Newborn, and the Diseases of Infancy. Under Physiology are discussed the Normal Infant and Artificial Feeding; under Pathology, Asphyxia, the Care of Premature Infants, Injury at Birth, the Infections of the Newborn, and Hemorrhage.

Under the Diseases of Infancy are included Acute Dyspepsia and Enteritis, the Respiratory Disorders, Disorders of Development, Dentition and the Infections of Infancy.

Artificial Feeding is treated very briefly—in reality too briefly to be of much practical value, and little or nothing is said about the digestive disorders of nursing infants. In the discussion of Obstetrical Palsies nothing is said about recent studies of the pathology of the condition, nor of the newer methods of treatment by removing the damaged portions of the brachial plexus. Especially to be commended is the handling of the subjects Asphyxia, the Infections of the Newborn and Dentition, and Influenza. The author emphasizes what cannot be reiterated too often that the brain hemorrhage following intelligent use of the forceps is due not to the pressure by the forceps, but to the intra-uterine pressure and the delay that made the forceps necessary.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE—SECTION ON PEDIATRICS.

Stated Meeting before the Academy, March 2, 1905.

DR. CHARLES L. DANA, PRESIDENT.

GONOCOCCUS INFECTIONS IN CHILDREN.

DR. L. EMMETT HOLT read this paper. He said that this subject was interesting to the genitourinary surgeon, the obstetrician, the gynecologist and the oculist as well as to those interested in pediatrics. He advised substituting the terms gonococcus ophthalmia, vaginitis or arthritis for the terms gonorrheal ophthalmia, vaginitis or arthritis, as these suggested a venereal origin which was seldom the case in young children. He related his experience with gonococcic infection in the Babies' Hospital during the past eleven years.

In 1894, when no bacterial examinations were made, only the most marked or severe cases were entered as vaginitis or ophthalmia. In that year 7 cases of vaginitis were recorded, all of which were admitted with the disease; 4 cases of ophthalmia were recorded all in newly-born or very young infants. No special pains were taken at that time in the disinfection or isolation of cases. In the following year the total number of recorded cases was 13, 6 of vaginitis and 7 of ophthalmia. In 1896 there were no cases recorded for the first eight months of the year. In this year examinations of vaginal discharges were made for the first time in the institution. The total number of cases was 9, 7 of vaginitis and 2 of ophthalmia. One case of arthritis developed in the hospital. In the light of more recent experience it is probable that this case contracted the infection from others as there were 3 cases of vaginitis in the same ward.

In 1897 there were 11 cases of vaginitis and 6 of ophthalmia admitted; 5 cases of vaginitis and 1 of ophthalmia developed in the hospital.

In 1898 there were 5 cases of vaginitis and 12 of ophthalmia; 5 cases of vaginitis developed in the hospital.

In 1899 three children were admitted and sent to the country home before it was discovered that they were suffering from vaginitis. They all came from the same day nursery. A serious house epidemic developed, which continued during the entire summer, practically all the inmates of one house being infected. All efforts at quarantine and disinfection proved ineffectual in checking the spread of the disease. The type of the disease in this epidemic was moderately severe. Greater care was exercised in admitting infected children to the wards. The result was that for a period of sixteen months there were only 10 cases of gonococcus infection recorded, 4 of these being admitted and 6 having acquired the disease from them.

The year of 1900 was a repetition of the preceding one. One girl of two years was unintentionally admitted and sent to the country home and two received from another hospital were found to be suffering from the disease. These three caused another house epidemic of 22 cases during the four months of summer. There was the same inability to check the spread. General house infection seemed to be the only explanation of the development of these cases.

In 1902 much more strict regulations regarding admission were enforced, yet six children were admitted at various times who were infected. These were quarantined as soon as discovered, and yet 11 secondary cases developed. Shortly after moving into the new hospital 1 case of ophthalmia was admitted and within the next few weeks, with absolutely new clean wards, 11 fresh cases developed, including 3 of gonococcus arthritis in boys under two and one-half months old. During six months from 5 infected cases that were admitted, 29 cases of vaginitis developed and 8 cases of gonococcus arthritis. In 1903 infection was again introduced into the country branch through a child from another hospital. The epidemic, though not so severe as the previous ones, caused great anxiety. The record for the year was 10 cases of vaginitis admitted, 55 acquired; 1 case of ophthalmia admitted, 1 acquired; 2 cases of arthritis admitted and 10 acquired. The large number might be accounted for by the fact that routine examinations were regularly made; many mild cases would not have been recognized without such examinations.

In the summer of 1904 the rule was adopted that no female child would be admitted without a microscopic examination of the vaginal secretion. The record for 1904 was 52 cases of vaginitis,

but only 16 of these could have been diagnosticated without bacteriologic examination.

In seeking to determine to what extent vaginitis existed in other institutions no dependence was made upon annual reports, but upon information from head nurses and hospital superintendents. These had come from almost every large hospital in the city to learn what could be done for this class of patients. It seemed that it was almost constantly present in children's wards. The matrons and managers of day nurseries are seldom aware of the prevalence and dangers of this form of infection and yet the hospitals received many cases from these institutions. He then gave the results of an investigation in this respect in several institutions, which served to give an idea of how generally prevalent gonococcus vaginitis was. His investigations showed that there was no more vaginitis in the Babies' Hospital than in other similar institutions, and that since the rigorous measures of quarantine and treatment, that there was much less than in most others. He had gone into detail to make it evident that in the gonococcic infections we had to deal with an organism which was very widely spread and highly contagious, and exceedingly difficult to eradicate from institutions, because of the prolonged duration of the cases and the obstacles in the way of complete cure. In considering the clinical manifestations of gonococcic infection three principal forms have been observed—vaginitis, ophthalmia and arthritis. These observations were made upon children up to three years of age. In two instances abscesses containing the gonococcus elsewhere than in the joints were found. There was only one case of gonococcus urethritis. There were no instances of endocarditis, pericarditis, peritonitis or pelvic inflammation and none of proctitis.

In well-marked cases of vaginitis the symptoms were fairly easy of recognition, the discharge was moderately abundant, yellow or greenish yellow in color and occasionally tinged with blood. Extension to the uterus tubes and peritoneum was not observed, nor was cystitis met with; urethritis was not common and seldom severe. In milder cases the discharge might be so slight as to escape detection except by close inspection. Constitutional symptoms are very few and insignificant and the temperature seldom rises over 101° .

The gonococcus is a diplococcus which decolorizes when stained by Gram's method; to be diagnostic it must be found with-

in the pus cells. In gonococcus vaginitis this is usually the only variety of bacteria present. It has been his custom to regard as suspicious all cases of vaginal discharge in infants in which many leukocytes are present. In his experience a nonspecific purulent vaginitis has been uncommon. One of the most troublesome features of this affection is its intractability; in spite of constant local treatment it sometimes continues for six or eight weeks. The use of proper local measures is difficult in young patients.

In regard to ophthalmia he said he could add nothing to what was already well known. He considered arthritis the most interesting phase of the gonococcic infection in children. He gave a report of 26 cases which he thought was the largest group of cases of this kind reported in literature in a single institution. Of these 19 were male and 7 female. Sixteen of these cases were three months old or younger. A single joint only was involved in but 5 cases. Three or more joints were involved in 16 cases. The largest number of joints involved was eight. The superficial symptoms are a rapidly developing articular swelling with early redness, acute tenderness and, in cases going on to suppuration, usually fluctuation at the end of a week. There was not much edema in the neighborhood of the joints, but the usual characteristics of acute pyemic arthritis. He thought that about one-third of the joints in which inflammation terminated in suppuration resolved. The pus was frequently a thin sero-pus. Of 21 cases in which the temperature charts were kept the fever reached 103° or over in 15 cases; in 5 it was 104° and in 1, 105°. The fever lasted in 1 case for eight weeks, in 9 either three or four, in 4 cases two weeks and in 7 but one week. Other symptoms were wasting, prostration and exhaustion.

Fourteen of the children died. In many of these cases death was due to marasmus and not to the pyemia.

The pathologic process in the joints was an acute inflammation chiefly affecting the synovial membrane. There was a complete recovery of function in many and a slight stiffness in a small number and marked fibrous ankylosis in only one or two. In children whose condition was fairly good early incision and washing out usually sufficed for rapid cure. Prolonged discharge with the formation of sinuses was not seen. It was difficult to diagnose this condition as it resembled acute articular rheumatism, but this disease is exceedingly rare in children under one year so that the symptoms described should always suggest pyemic arthritis.

As to the means by which infection is spread he said that under three years of age direct contact, sexual or through the hands played no part. The most obvious means was through the medium of napkins. It had been their custom to soak the napkins in a disinfectant, boil in suds and put through a steam sterilizer. Thermometers, nipples and bottles were kept separate with the greatest care. Sponges were abolished and absorbent cotton used for bathing purposes, which was immediately destroyed. Bathing in tubs was interdicted, yet the infection spread and there was only one explanation, the nurses carried the infection. Quarantine of both child and nurse was the only means by which spreading could be checked. He cited cases where it seemed evident that the nurses had conveyed the disease.

One of the most difficult questions to solve is how the gonococcus gains entrance in certain cases of arthritis. He suspected that in some cases it was through the mouth. The nurses no longer cleansed the mouths of infants with absorbent cotton around the little finger, but used a wooden toothpick instead.

In a disease so difficult to cure and so highly contagious it was of utmost importance that we should pay the greatest attention to prophylactic measures. In institutions it is essential that we exclude gonococcus vaginitis as far as possible, and if it is admitted by accident it must be quarantined. In excluding cases only one thing could be depended upon and that was the bacteriologic examination. Children applying for admission with such conditions that they must be received should be isolated. Even the cases of gonococcus arthritis should be isolated. In the Babies' Hospital a smear from the vaginal secretion of every girl is examined once a week. This might not be necessary so frequently where there are not so many admissions. In institutions where microscopic examinations are not possible the use of a fold of gauze placed between the labia will be found useful, as it will show even a very slight discharge. If at all purulent the case should be regarded as specific until microscopic examination shows it to be otherwise. On no account should napkins, underclothing or sheets from infected children go into the general laundry of the institution. Sponges and wash cloths should not be used in an institution. Bath water and the bath-tub may harbor the infection and convey disease even though the water has been changed. The most scrupulous precautions should be taken with reference to the nurse's hands. They should be carefully washed

in a disinfectant after bathing or changing the napkins of each child. Thermometers, catheters, syringes or tongue depressors may be the medium of contagion unless sterilized after use. After an outbreak in a ward as much thoroughness in fumigation should be employed as after an outbreak of scarlet fever. Frequently all these things have been thoroughly carried out, and yet the disease spreads from one child to another until isolation was practised.

GENERAL CONCLUSIONS.—(1) We must recognize gonococcus vaginitis as a very frequent disease and one to be constantly reckoned with in institutions for children. It is also very frequent in dispensary and tenement practice and not uncommon in private practice of the better sort.

(2) In its milder forms and in sporadic cases it is extremely annoying, because so intractable; in its severe form it may be dangerous to life through setting up an acute gonococcus pyemia or infection of the serous membranes, and in its epidemic form it is a veritable scourge in an institution.

(3) The highly contagious character of gonococcus vaginitis makes it imperative that children suffering from it should not remain in the same wards or dormitories with other children. A similar danger, though less in degree, exists with the gonococcus ophthalmia and acute gonococcus arthritis or pyemia.

(4) It is practically impossible to prevent the spreading of the disease, if infected children remain in the wards with others. They must either be excluded from the hospital or, if admitted, immediately quarantined.

(5) Cases of gonococcus vaginitis can only be excluded from hospital wards by the systematic microscopic examination of a smear from the vaginal secretion of every child admitted. If a purulent vaginal discharge is present such examinations are imperative and should be made as much a matter of hospital routine as the taking of throat cultures in children with tonsillar exudates. In the absence of a bacteriologic examination a purulent discharge in a young child may be assumed to be due to the gonococcus.

(6) The quarantine to be effective must extend to nurses and attendants as well as to children. Furthermore, the napkins, bedding, and other clothing of infected children must be washed separately from that of the rest of the house.

(7) Where the gonococcus is found with no vaginal discharge, or with a very slight discharge, children should also be

quarantined, although it is impossible at present to say to what degree such cases may be dangerous in the ward. One of the greatest difficulties in connection with the gonococcus vaginitis arises from the prolonged quarantine rendered necessary from the fact that these cases are of very chronic character and very resistant to treatment.

(8) Nurses. The danger to nurses from accidental infection, especially in the eyes, is considerable. At the present time we are not sufficiently instructed in this respect.

DR. F. C. WOOD said that he had but little to add, from the point of view of the clinical pathologist. Some of the technical details of the method used, however, might be of interest to the members of the Section.

Cultural procedures for the isolation and identification of the gonococcus were so complicated and difficult of execution that they must be left for the trained bacteriologist. The practitioner must always depend upon the morphological identification of the organisms in smears. The speaker had been accustomed to take advantage of the sharp morphology of the organisms, when stained by means of the Jenner blood stain. The smears should be very thinly spread and as soon as dry could be stained in the alcoholic mixture for three minutes. At the end of this time the bacteria were fixed and stained. If the smear were from a case of gonococcic infection, it was usually very easy to find the characteristic organisms in the bodies of the leukocytes. The Jenner stain gave a specially good differentiation, because the cell body stained reddish while the gonococcus took a deep blue stain. It was important, however, to remember that other cocci could assume the biscuit shape and also be found in the bodies of the leukocytes. This was especially true of the micrococcus catarrhalis which had been found in the urethra. These organisms were, however, usually larger than the gonococcus. It was advisable to keep some stained smears containing undoubted gonococci to control the microscopic findings. The micrococcus catarrhalis was also negative to Gram so that this procedure offered no differential points.

If after some search organisms were found which were in the pus cells, but which did not correspond to the morphology of the gonococcus, it was convenient to do a Gram stain on top of the Jenner preparation. The slide could be ringed with some waterproof ink, or the position of the doubtful cells marked on the co-

ordinates of a mechanical stage; and, preferably after fixation of the slide by heat, a Gram stain could be carried out in the usual manner. The same group of organisms could then be reexamined and their relations to the Gram stain determined. This was somewhat more convenient than making a Gram stain first, as it was more difficult to find the organisms than with the Jenner stain.

Especial care should be taken in obtaining the material so that the difficulties of diagnosis were not increased by the presence of a large number of saprophytic bacteria which were frequently present in the vulva region. It was better in the case of children with abundant discharge to pass a small platinum loop into the vagina and urethra if possible, and thus obtain the material uncontaminated.

As regards disinfection of the linen in these cases of gonococcus vaginitis in children, the most suitable method seemed to be the use of one of the more penetrating disinfectants, such as formaldehyde or carbolic acid, for the preliminary disinfection. All clothing should afterwards be boiled or thoroughly steamed. The gonococcus is well known to be one of the most easily destroyed organisms, but sometimes a superficial disinfection with a non-penetrating disinfectant, such as bichlorid, might leave living organisms inside of a mass of mucus or pus.

DR. J. CLIFTON EDGAR.—From the obstetrician's standpoint gonococcic infection in infants concerns the eyes, the mouth, the stump of the umbilical cord and the vulvovaginal canal, resulting, respectively, in gonococcus ophthalmia, gonococcus stomatitis, gonococcus omphalitis and gonococcus vulvovaginitis.

Three of these infections namely, eyes, mouth and vagina, are infections of mucous membranes and one, namely the umbilicus, is an infection directly into the lymphatics or veins of the stump of the umbilical cord. From the standpoint of the obstetrician gonococcic infection of the mucous membrane of the eyes is by far the most frequent of the four sites of infection. The delicate mucous membranes of the eye of the newly-born offer little resistance to gonorrheal infections, especially after improper and rough efforts have been made to cleanse the eyes. Then, again, the eyes may be injured during rough vaginal examinations, during labor in face and brow presentations, and in different extractions of the after-coming head in breech presentations. These abrasions of the mucous membranes render the occurrence of infection more

liable to occur and more serious in character. Our knowledge of gonococcic infection of the mouth, umbilical stump and vagina in the newly-born is not what one might expect—indeed it is very meagre. Nothing of great value has ever been published upon these infections.

There are two reasons for this:—

I. The subject is a "borderland" subject divided up among the obstetrician, the pediatricist and the ophthalmologist. Each specialist cares only for a particular aspect of the subject. As someone has said, "the oculist has no interest in lesions of the mouth, umbilicus or vagina."

II. Then, again, the obstetrician is chiefly interested in the subject of intrapartum transmission, to the neglect of perhaps other methods, and the pediatricist sees his cases too late to enter into the question of transmission. Further, it is now realized that the very young baby is highly predisposed to gonococcic inoculation and that it is quite as likely to be infected *after* (Aichel thinks more so) as during birth. Hence, recent writers, in treating of gonococcic infection in children, make hardly any distinction between gonorrhea neonatorum and the same disease in young infants in general.

(1) Rosinski, in 1891, first described gonorrheal stomatitis, and he could find no literature upon the subject up to that date.

(2) Baginsky, writing in 1903, believes that he is the first to publish anything on gonococcic infection of the umbilical stump, it having previously been assumed that umbilical infection is due to ordinary pyogenic cocci. His case, as far as he knows, is the first on record. An ulcer in the mouth gave negative results. Transmission could not be traced.

(3) Aichel, writing in 1891, maintains that vulvovaginal gonococcic infection of the newly-born has been recorded only a few times. Aichel could find records of but 2 cases of this infection to which he adds a third. In 2 of these cases—Aichel's and Koblanck's—infection undoubtedly occurred during labor. In Morgenstein's case transmission not evident.

His belief was that gonococcic infection, intrapartum or directly postpartum, of the mouth, umbilical stump, vulva and vagina are very rare conditions and seldom met with. This infrequency one might expect from the nature of the conditions, namely, the ligature of the cord, and the nonexposed condition of the mucous membrane of the mouth and vagina.

Moreover, that modern prophylactic measures have greatly reduced the frequency of gonorrheal ophthalmia of the newly-born from 12 per cent. to less than 2 per cent. During the past five years at the Bellevue Emergency Hospital there has been no instance of serious cord suppuration. There were 4 cases of cord suppuration, but all yielded to treatment and were discharged cured at end of fifteen days. One of these cases showed a purulent ophthalmia, coincident with suppurative omphalitis. No case of cord suppuration was transferred during this time, and there was no case of ophthalmia that did not yield readily to treatment in a few days. No cases of sore eyes were transferred.

Several mothers with little children were transferred immediately after labor, because of evidences of vaginal inflammation. Purulent ophthalmia occurred in most of these cases. His resident nurse reported that, as far as she was able to trace them, these cases showed no loss of sight. In 800 cases recently delivered in Dr. Hill's Outdoor Tenement Service, in Seventy-sixth Street, there were records of 5 cases of ophthalmia, 2 of which were so severe as to necessitate being transferred to a hospital. Several superficial local infections of the cord occurred, and one death from probable gonococcic cord infection, although an autopsy was refused.

After all, from the obstetrician's standpoint, the interest in gonococcic infection of the newly-born centres in the prophylactic treatment.

The scientific gospel of Bunn and Krönig, namely, that the vaginal mucus has a bactericidal action has been misunderstood as applying to the gonococcus. It has so such action. The fetus has been infected with the gonococcus *in utero*.

In the section on Prophylaxis of Ophthalmia Neonatorum in Winkel's Handbook, Bd. II., it is stated that there are a number of reports which show that a fetus may be infected with the gonococcus *in utero*, and be born with well-developed conjunctivitis. If the vagina is usually sterile, it needs no preparation for labor; if the reverse, it does. It was Dr. Edgar's belief that in hospital practice, at least, such preparation of the vagina is necessary to prevent ophthalmia neonatorum.

At the Emergency Bellevue Obstetric Service and New York Maternity, after repeated attempts to do away with antiseptic preparation of the vagina for labor, he had abandoned the attempt and now always uses antepartum vaginal irrigation as a prophy-

lactic measure. Both services are largely venereal in character. In private practice he did not as a rule use antepartum vaginal irrigation—this a concession to the popular belief that there is less gonococcic infection in private practice, and yet every now and then he saw gonococcus ophthalmia in spite of Credé's nitrate of silver method of prevention. He had such a case some years ago in his practice, where the husband had his acute gonorrhea in August and married in January. The baby all but lost the sight of both eyes, and finally recovered.

Antepartum vaginal preparation, and Credé's nitrate of silver method after birth will greatly reduce the percentage of gonorrheal ophthalmia, but they can never entirely abolish it.

It has been proved conclusively that the gonococci may invade the uterus and infect the fetal eyes antepartum.

The obstetrician knows of no method that will positively prevent the occurrence of gonococcic infection of the fetus in a woman the subject of such infection.

So long as men with gonorrhea are permitted to marry and women with gonococcic infection to conceive, so long will there be danger of a gonococcus ophthalmia in the newly-born child.

DR. R. B. KIMBALL said that this was a subject that required very serious consideration, and that he wished to emphasize some points. The paper read was particularly interesting to him because he had seen many of these cases and shared in the vicissitudes encountered at the Babies' Hospital, where they had such a serious time for several years. The cause of this was, in all probability, because babies and children were admitted with gonorrhea although no symptoms were present, and the only possible way to rid the institution of the infection was in preventing the entrance of more cases. Such cases should be kept out of the wards. He referred to an experience of his one year ago last summer, at Sea Bright; a gonococcic infection broke out after he was down there but one week. The cases were isolated and the nurses who attended these isolated cases were not allowed to go near the other beds or other nurses. Each child had its individual thermometer which, after using, was kept in strong bichlorid or alcohol. All napkins were destroyed and new material purchased from which new napkins were made. In spite of all precautions the infection spread just the same. He thought the spreading occurred mainly through the fault of the night nurses, who have so many changes

to make, through the night, that it is impossible for them to properly cleanse their hands. He said that very few could comprehend the insidious nature of the infection; one could not appreciate it unless they served in an institution for infants. It seemed strange that in the Babies' Hospital no cases were met with in adult females, who numbered about thirty. It was also surprising that the importance of the infection was not recognized by the health authorities and ranked with other acute infectious diseases and tuberculosis.

DR. KOPLIK said that, when he took charge of the Mt. Sinai Hospital service for children, there was not a female child on that service who was not the subject of gonococcic infection. A child once infected he knew of nothing more baffling than efforts at ridding the child of this infection, and he believed that when children once contracted the disease they were more or less crippled for life. When he first took charge of his service he was compelled to find some remedy to control the disease on account of its widespread prevalence, and he tried every possible means and finally devised one of the most perfect systems of prophylaxis and isolation practised in this city; at the same time the system was an expensive one, 140 diapers being used daily, the annual cost was \$1,500 for this item alone. The diapers were burned after being soiled. The great question arose, recently, as to how to limit or to do away with this expense. He went to the different institutions in this city to see how they prevented this infection and he could, as a result of this visitation, confirm what had already been stated that there was not an institution in the city devoted to the care of children, that was not the seat of gonococcic infection, endemic and epidemic. In every one their system of prophylaxis was imperfect. In one institution they were very careful in sterilizing the napkins, but the same thermometer was used for twelve or fifteen children in the ward. In yet another institution all the children in one room were bathed in the same tub. Dr. Koplik advised that they be bathed in their cribs. In the prevention of the spread of this disease, and the stamping out of it, the most perfect prophylaxis should be enforced. Dr. Koplik had not had a single epidemic of vulvovaginitis for at least two and a half years because of his prophylactic measures. Every gonococcal case that came into his service was immediately isolated, given a separate bed, special nurses and utensils, and the beds were marked with red

ribbons to distinguish them. He said he was not afraid to take such a case into his institution and into the wards with other children, if he could have his directions carried out by his nurses. Every child in the service had its own thermometer, bed pan, its own liquid soap, its own wash rag, its own comb which could be boiled, and its own wash basin. By such prophylaxis each baby was as completely isolated from its neighbor in the ward as though it were in a separate room. He did not believe that diapers could be disinfected, chiefly because the nurses and other ward help could not be depended upon except for a short time to carry out proper disinfection.

DR. T. S. SOUTHWORTH said that such infectious scourges as diphtheria, scarlet fever, etc., could be stamped out by well-recognized measures, isolation and quarantine, but this was not the case with an outbreak of gonococcus vaginitis, because cases that were clinically and apparently cured were still a menace, since the disease might be latent and break out at any time. In the city of New York he said there was no question but that cases of vaginitis of gonococcic origin were on the increase. He did not believe there was an institution in the city that was devoted to the care of babies and children but that had, at some time during the year, some cases. Such epidemics would occur unless the utmost vigilance was exercised. Until we knew the manner of its spread, how it was transmitted from case to case, he said we were working in the dark. So soon as a single case entered the building there was then danger of an epidemic. Isolation was, in his opinion, the only way to meet the trouble. The ordinary hospital nurses he did not consider to be competent to prevent the extension of the disease from one patient to another. The amount of the disease in New York City was surprising; in one institution alone as many as 5 cases applied for admission in a single day and were refused because the gonococci were found in the smears. He considered it unsafe to admit female children from certain institutions which were known to be full of cases of gonococcus vaginitis. The efficiency of treatment depended upon the thoroughness with which it was carried out; irrigations of solutions of bichlorid, or nitrate of silver, or other silver salts such as argyrol, protargol, etc., were efficient if properly done. Irrigations alone were, however, not as efficacious as when followed by the introduction of a gauze wick, because the solutions did not remain long enough in contact with the parts. He advised soaking the gauze in a 5 to 10

per cent. solution of ichthyol, or a 4 to 10 per cent. solution of argyrol; the introduction of this prevented the walls of the vagina from coming in apposition, facilitated drainage, kept up continuous medication, and emphasized the surgical nature of the case, and the necessity of keeping on a bandage or diaper, without which latter the child might easily convey infection to the eyes.

DR. ARNOLD KNAPP limited his discussion to diagnosis and treatment. The diagnosis of a gonococcic infection of the conjunctiva in the new-born could not always be made early from the clinical picture; there were unquestionably very severe forms of conjunctivitis due to the pneumococcus or streptococcus and quite mild forms due to the gonococcus. Therefore, a microscopic examination of the pus should be resorted to in order to make a diagnosis. Metastasis from the eye he did not believe ever took place, unless the infection traveled along the nasolachrymal canal.

The prophylactic treatment was of the greatest importance. A great many eyes, he said, had been saved through the use of the Credé method, but this was a method he considered to be very severe, in fact too severe for general use. He advocated in addition to disinfection of the parturient canal, the careful cleansing of the eyelids after birth of the child as the most important prophylactic measures. Argyrol can be instilled; in this stage this acts as well as nitrate of silver and is far less irritating. The treatment of gonococcic infection of the eyes consists in the use of ice-compresses, frequent irrigation of the conjunctival sac and in the later stages silver nitrate, which cannot be replaced by any of the more recent silver preparations.

DR. JOHN E. WEEKS spoke of the relative infrequency of gonorrheal infection of the conjunctiva in children between the ages of two and fourteen years, but said that cases were observed from time to time and that in residential schools it sometimes became epidemic. He cited an instance of the appearance of gonorrheal ophthalmia in a residential school for girls. About 10 per cent. of the inmates became affected with gonorrheal ophthalmia. It was ascertained that one of the girls had a purulent discharge from the vagina, and on investigation it was found that twenty-two of the eighty-seven girls in the school had gonorrheal vaginitis. By far the greater number of cases of gonorrheal infection of the eye occurred in infants. Of the patients with diseases of the eye

treated at the New York Eye and Ear Infirmary during the last forty years, 0.5 of one per cent. suffered from ophthalmia neonatorum. The principal mode of infection was by entrance of the gonococcus into the eye of the infant during its passage through the birth canal, but antepartum and postpartum infection occurs as well as infection during labor. The time of onset of the ophthalmia was greatest within the first five days. The cases occurring during the first and second days were due to infection during labor and by very virulent gonococci. These were usually the most severe cases. Cases occurring later were apparently frequently due to gonococci whose virulence was attenuated and were much milder in character. The gonococcus attacks the healthy conjunctiva, may penetrate to the subepithelial tissue and enter blood-vessels and lymph-channels. Gonorrheal arthritis was mentioned as a complication of ophthalmia neonatorum. Dr. Weeks referred to 2 cases that came under his observation, in one of which the arthritis developed two weeks after the onset of the ophthalmia; in the other, three weeks after the onset of the ophthalmia. Corneal ulcer in gonorrheal inflammation of the eye was referred to as being due to the staphylococcus or streptococcus after interference with the nutrition of the corneal epithelium by the toxin of the gonococcus. In referring to prophylaxis, the opinion was expressed that in argyrol and protargol remedies were at hand which could be used after the manner of Credé, which were fully as efficient and much less irritating than the 2 per cent. nitrate of silver solution with which Credé obtained such excellent results. Prophylactic measures should be employed in every case of the birth of a viable child. The results of treatment were most satisfactory if the child could be cared for by competent nurses. Frequent cleansing of the eyes with a saturated solution of boric acid, and the well-advised use of the nitrate of silver, protargol, or argyrol would seldom fail to promote recovery without impairment of vision. [Dr. Weeks's discussion will be found in full on page 346 of this number of ARCHIVES OF PEDIATRICS.]

DR. WISNER R. TOWNSEND emphasized the importance of a correct diagnosis and said that in the Hospital for Ruptured and Crippled they met with but very few cases in infants, the indoor patients consisting of children between the ages of four and fourteen, but in the Dispensary patients of all ages were treated. Considering the topic from the orthopedist's standpoint there were

three classes of cases, (1) periarthrititis, (2) simple effusion into the joint and (3) cases of mixed infection with the gonococcus present. To determine the condition required a bacteriologic examination, especially in those cases where vulvovaginitis or urethritis was not marked. In children, local treatment in the shape of plaster casts or braces was always necessary and very advisable. It was very important that complete immobilization of the involved joints should be effected, not partial rest. When pus in the joint appears it was better to incise, but not to do any extensive operations on the bone even when the bone is involved. The prognosis in arthritis occurring in children, he said, was more favorable than in adults, as sepsis was better tolerated and the recuperative powers stronger. As a rule, in the cases he met with in the Hospital for Ruptured and Crippled with a gonorrheal vulvovaginitis very few joint complications were met with. He closed the discussion by again emphasizing the importance of a correct diagnosis.

DR. A. JACOBI said that this was a subject that should be recognized by the Department of Health, but the question was whether we should go to them at once before more had been done by the members of the Academy. If records were taken of each hospital and dispensary for one, two or three years then enough or ample material would be had to present to the Health Department and we then could expect them to notice the conditions officially. He thought that much could be done by collecting such statistics for at least a year or two. He did not believe that any motion should be made at present to present any fact to the Department of Health for a year or two.

DR. PRINCE A. MORROW thought that it would be useless to present the matter under discussion to the Department of Health, because they knew of the existing evil and regarded it as a *noli me tangere*.

ROOF PLAYGROUNDS ON CITY ROOFS, WITH ILLUSTRATIONS.

DR. WILLIAM P. NORTHRUP read this paper. He emphasized the importance of making use of the roofs as winter playgrounds for city children, and explained exactly how such playgrounds could be constructed. Photographs of a number of roof playgrounds were exhibited.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, February 14, 1905.

DR. J. H. MCKEE, PRESIDENT.

A CASE OF HEAD NODDING ASSOCIATED WITH NYSTAGMUS.

DR. R. S. MCCOMBS presented this patient, an infant four months old, with associated movements of the head and eyes. The family history was negative. The child's birth was normal, and he had been well ever since. He had been breast-fed exclusively. The nystagmus was the first symptom noticed by the mother, when the patient was about three and one-half months old. Shortly after this the head nodding appeared. The child appeared fairly well-nourished. There was noted a rachitic rosary, and epiphyseal enlargement at the wrists. There was a constant nodding of the head, anteroposteriorly, with an occasional retraction to the right side. There was also present a vertical nystagmus, equal on both sides, and increased by near fixation. The fundus was normal. The interesting features in connection with this case were: The early age of the patient, the absence of an exciting cause, with the exception, perhaps, of the rickets, and the fact that the nystagmus was vertical.

DR. SPILLER said that the cause of these involuntary movements is unknown. Such movements are frequently seen in children with rachitis and not infrequently disappear later. It is difficult to find the explanation in the rachitis. As regards the view that these movements are caused by cortical irritation, it is to be acknowledged that the centre for the movements of the head, and probably that for the associated movements of the eyes, are near together. Involuntary movements of the upper limb are not commonly associated with these tremors of the head and eyes. If the cause were cortical irritation, it is remarkable that the upper limb usually is not affected. The centre for the upper limb is near the centre for the face and near the centre for the associated ocular movements in the frontal lobe.

A CASE OF PSEUDOHYPERTROPHIC MUSCULAR PARALYSIS.

DR. H. C. CARPENTER presented this patient, a boy of fifteen years. The weakness of the lower extremities was first noticed when he was about four years old, and since then it has been increasing steadily. The patient presents all the classical symptoms of the disease, with typical station, gait and pseudomuscular hy-

pertrophy. There is marked hypertrophy of the calves, also of the tibialis anticus, quadratus lumborum and infraspinalis muscles. The scapulo-humeral muscles are wasted. There is also mental weakness. The knee jerks are not diminished. No reactions of degeneration present in arms or legs. A full report of the case, together with photographs, appears in this number of ARCHIVES OF PEDIATRICS, page 353.

DR. SPILLER said that he recently had seen a case of muscular dystrophy which showed atrophy of the bones, and that the latter is often overlooked in the study of this disease. He had reported the microscopic examination of a case originally studied by Duchenne, of Boulogne, in which the nervous system was found to be normal. There was intense atrophy of all the muscles, even of the diaphragm. A few cases have shown lesions of the nervous system, but muscular dystrophy is essentially a disease of the muscles.

DR. BOCHROCH said that he was unable to elicit any knee jerks in this patient, although he understood Dr. Carpenter to say that this sign was present. The knee jerks are generally absent; at least it is unusual to find them in a case so far advanced. He recalled a number of instances of the disease occurring in several members of a family. This patient, he believed, was the only one of his family so afflicted.

DR. CARPENTER said that the knee jerks were present in this patient, if not exaggerated. The notes of the case from the Children's Hospital showed that the knee jerks were exaggerated when the boy was a patient in that institution.

A CASE OF CEREBROSPINAL FEVER.

DR. GRIFFITH, in presenting this patient, said that there is much discussion regarding even the existence of cerebrospinal fever as an entity. While some text-books give it a place among the infectious diseases, others do not refer to it at all in that connection, and one must seek for it among the various forms of meningitis. There seems to be no question that the same complex symptoms may be produced by different varieties of germs, the meningeal disease being often secondary to some other affection. It is also true, however, that leptomeningitis does present itself in an epidemic form, and with both the fixedness and the power of variation of symptoms which are so characteristic of infectious diseases.

By those who regard cerebrospinal fever as an independent infectious disease various types are described. Among these may be mentioned the typical, the abortive, the intermittent, the chronic, etc. One of the most trying of these to the patience of the physician and of the family is the chronic form, and as a good instance of this, showing how prolonged a course the affection often runs, he wished to exhibit the patient whom he had brought before the Society to-night.

Willie Rodosky, six and one-half years old, was brought to the Children's Hospital, Philadelphia, on November 11, 1904, where he was under the care of Dr. Miller. There was nothing of moment in the family history, and the patient had been a healthy child. Five days before admission he was taken ill with fever, headache, vomiting, constipation, abdominal pain, anorexia and malaise. On the evening of the second day he became delirious, and had continued so at times. A day or two before admission convulsive twitchings had occurred, and his neck became stiff. On the fourth day the eyes became crossed. Abdominal pain was at times complained of. On admission into the hospital he was irritable and semidelirious, but not unconscious; the eyes were crossed, the pupils were slightly dilated, but reacted to light. There was cervical opisthotonus, great rigidity of the whole body, and extreme hyperesthesia, so that touching of any portion of him caused him to utter a sharp cry. Kernig's sign was present. The leukocytes numbered 19,520.

The patient continued in much the same condition, being very irritable, fretful and hyperesthetic. Examination of the eye-grounds, on November 12th, gave practically negative results. On this date lumbar puncture was done, and 2 drams of cloudy fluid removed. On sedimentation a creamy yellow deposit of pus formed. Examination showed the presence of the diplococcus intracellularis.

Improvement was extremely slow. Gradually retraction of the head diminished. A second lumbar puncture done on the 16th gave a similar fluid, so thick, however, that it was necessary to aspirate it. By the end of the month some improvement had shown itself, the boy being quite rational to questions and less fretful, though rigidity and hyperesthesia continued, and in a few days retraction had shown itself. Throughout December there was very little alteration in any symptoms. Examination of the eyes on January 24th, by Dr. Randall, showed small extravasations of blood in

each retina, and the general appearance of an albuminuric retinitis. During the last week of December he was out of bed in a chair, although very weak and thin. Throughout January he improved steadily, although slowly, having gained the power to walk with an unsteady gait. Both eyes could be turned to the right. On the 30th of the month he had nausea and vomiting, followed by what appeared to be an attack of fainting, but which was probably a slight convulsive seizure. Examination of the blood on the following day showed 14,350 leukocytes. In the week following this attack he deteriorated in health, and lost over 2 pounds in weight. On the 13th of the month two other convulsions occurred, this time more marked. The blood now showed 17,050 leukocytes, the differential count giving 13 per cent. of leukocytes and 81 per cent. of polymorphonuclear cells.

The boy has a normal expression, except for the internal strabismus. He is thin, and looks rather feeble and delicate. The interesting feature is the temperature chart. Some days after admission the temperature ran a course of 101° F. to 104° F., without any definite regularity. It then gradually descended, and toward the end of the month would sometimes touch the normal line, although generally about 102° F. Throughout December it was extremely irregular, some days not exceeding 100° F., but generally going to 102° F., and occasionally 103° or 104° F. About the middle of December it exhibited an intermittent type, without any decided regularity. It is to be noticed, however, that until nearly the end of January the temperature did not become afebrile. Even then it showed anything but a regular line, being often below normal, and other times reaching 100° F., with occasional rises to 101° F. During the last week of January there was a still more irregular temperature curve, of which 100° F. might be taken as the middle line, the temperature going irregularly above and below this.

It is now at the 100th day of the disease, as near as we can calculate. Were it not for this temperature chart one might think the boy had practically recovered. We have, however, three other factors which make me uneasy about him. The first symptom is the strabismus, although this I imagine to be but the remaining effect of some lesion, the active state of which has probably passed away. The second is painful rigidity of the neck, and at times of other parts of the body. The third symptom, and a grave one, is the development of convulsions. These three symptoms, com-

bined with the irregular fever, give us every reason, I fear, to believe that we are not yet through with the inflammatory process, or with the damage which the attack may leave.

Note, March 7th.—It is now three weeks after the exhibition of the patient, and the 121st day of the disease. The rigidity of the neck and the irregular temperature are still present. The strabismus is decidedly less. There have been no more convulsions.

DR. MILLER said that he had seen the patient before at the Children's Hospital, where he had been under his care for a month. He thought he had improved very much, for when he last saw him he was still in bed and emaciated. He considered the case interesting from the fact that, notwithstanding the notes, the child had never been very delirious, and after the first ten days became quite rational, answering questions and laughing when spoken to. He was extremely hypersensitive to touch or sound; his neck was very rigid, and he could not move at all. Dr. Miller thought the best treatment in these cases was opium; it had a very excellent effect on this patient. The thermo-cautery, also, had been used in this case without benefit. Lumbar puncture was resorted to three times; 2 drams being withdrawn at the first tapping, and half an ounce upon each other occasion. This measure gave no relief, nor had he ever known it to be of appreciable benefit in the cases in which it had been employed by him. A point of differentiation between the epidemic cases, and those due to other organisms, was that many of the former get well or become chronic, while the latter are nearly all fatal, at least, such cases at the Children's Hospital had all died. Dr. Miller thought there was not sufficient evidence for assuming that this form of meningitis is contagious, and that the rule of the Board of Health requiring them to be reported was unnecessary. Often they cannot be distinguished, clinically, from the other forms of meningitis.

DR. McKEE called attention to the occurrence of hydrocephalus occasionally following cases of chronic epidemic meningitis. In a series of cases with this complication, recently reported, one had vomiting, fainting spells and later convulsions. He thought that from the symptoms such a condition might subsequently appear in this child.

DR. GRIFFITH called attention to the fact that deafness, blindness, and even idiocy, often follow this disease. Thus, for in-

stance, of two sisters ill in the Children's Hospital, one died and the other left, apparently entirely well; but to their disappointment was brought back some months later totally deaf. He thought the child which he presented this evening was by no means yet out of danger, as there was evidently some active process still existent.

A CASE OF MULTIPLE EXOSTOSES.

DR. GEORGE W. NORRIS presented this patient, a boy of seven years. The family history was negative. He has had pertussis and measles, and two years ago had scarlet fever, as a sequel to which he suffered from what appears to have been an attack of arthritis, which confined him to bed for six weeks. About eighteen months ago the father noticed that the boy had "queer joints." There has never been any complaint of pain since the attack of arthritis. The child was brought to the dispensary on account of failing health, pallor and frequent attacks of bronchitis. His temperature was $99\frac{1}{2}^{\circ}\text{F.}$; pulse 90. There was noted bronchovesicular expiration with slight impairment of resonance, posteriorly, at the right apex, but no râles. Distributed over the skeleton were numerous osteophitic excrescences, painless, and causing no restriction of motion. They were symmetrical and bilateral, being most commonly felt on the long bones, near the epiphyseal junctions; some on the epiphysis, others on the shaft. They were more or less conical in shape, the base being nearest the skeleton. They were noted in the following regions: The upper ends of both humeri, the one on the right about the size of a small lemon; on the external surfaces of both radii and ulnæ, the size of chestnuts; the clavicles, the tibiæ and fibulæ, the upper end of each femur and the costochondral junction on the left side from the fourth to the seventh ribs.

DR. ELEANOR C. JONES stated that she had at present under her care a family of four children all of whom had multiple exostoses. The father is also afflicted with the disease. The youngest child is a baby of eighteen months.

DR. EDSALL recalled a similar case in a boy who died of pneumonia when fourteen years old. The disease first appeared in the scapula, when the child was two years old, and the condition was said to have been diagnosed and treated at that time as a fracture. This patient had only half a dozen exostoses, but they were all very large; one on the thigh was as large as an infant's head.

DR. W. J. TAYLOR knew a man forty-five years old who had

eight or ten exostoses. The disease was an inheritance from his father. One exostosis on the thigh was so very sharp that it would frequently pierce the muscle and cause an acute inflammation. Recent studies have shown the disease to be closely related to myositis ossificans.

A CASE OF HYDROCEPHALUS.

DR. J. H. McKEE again presented a patient with hydrocephalus, an infant shown before the Society just one year ago. In November, 1903, when pressure symptoms were marked, 23 ounces of blood-stained fluid were removed by puncture of the left lateral ventricle. The fluid reaccumulated slowly, and the child was tapped again in March, 1904; 11 ounces of blood-stained material being secured. Blood was found by microscopic study, and 6 or 7 tubercle bacilli were revealed in each microscopic field. Since that time the boy has improved in every way, and the fluid has not reaccumulated. Indeed, the cranial circumference has decreased 1 inch, from $26\frac{1}{4}$ to $25\frac{1}{4}$ inches. The sutures have also closed, and the fontanel has become depressed and soft. Intelligence and physical development have also progressed most remarkably. Recently the boy has suffered from epidemic influenza, double otitis media and an attack of facial erysipelas, in spite of which his meningeal symptoms have not recurred.

DR. SPILLER said that internal hydrocephalus occasionally results from meningitis, and is caused by the occlusion of the communications between the subarachnoid space and the fourth ventricle. It is difficult to determine the origin of hydrocephalus in certain cases. He had been able in 1 case to find the cause in occlusion of the aqueduct of Sylvius by proliferation of neuroglia, and in another case by an inflammatory process about the foramen of Monroe of one side. In the first case the lateral and third ventricles were much distended and the fourth ventricle was normal. In the second case the internal hydrocephalus was confined to the lateral ventricle of the side on which the foramen of Monroe was partially occluded.

DR. McKEE said that he had examined a woman who was an intimate friend of the mother of this child, and who resided in the same house with them, and found her to have tuberculous disease of the right apex. She was accustomed to take care of the baby in the early days of his life. He thought this might throw some light upon the etiology of this case.

Current Literature.

PATHOLOGY.

Onuf, B.: Some Interesting Autopsy Findings in Epileptics. (*Journal of the American Medical Association*, April 29, 1905, p. 1325.)

The writer reports the results of careful autopsies on sixteen epileptics at the New York State Institution for Epileptics. In 12 cases there were valvular changes of the heart, most frequently of the mitral valve (80 per cent.), less so of the aortic and still less frequently of the tricuspid valves. These he considers generally as secondary results of the special strain due to the major epileptic attacks. Capillary changes, tortuosity, and aneurysmal dilatations, were observed in several cases, and were attributed to the same causes. In 8 of the cases where the lungs were examined, there was acute pneumonia as a contributory cause of death. The cerebral changes were very striking. In 10 cases there was a marked thickening of the pia chiefly over the frontoparietal lobe. In other cases there were vascular lesions, circumscribed atrophy of one frontal lobe, subdural hemorrhage (1 case), internal hydrocephalus (1 case), cerebellar cyst (1 case) and shrinkage of convolutions of vermis and adjoining cortex (3 cases). The most striking changes, however, were noted in the thalamic region. These were in the nature of atrophy, sometimes the pulvinar, sometimes the other portions being most markedly affected. There was also an apparent discrepancy in the proportions of the geniculate bodies. Onuf discusses the possible relations of these thalamic changes to the epilepsy, but does not venture to express an opinion as to whether they are directly connected with the seizures, or are only part of a general pathologic condition of the brain. He suggests that there was probably an optic atrophy in some of these cases, and hence the importance of fundal examination in epileptics. The importance of good clinical histories in these cases is also emphasized.

Pavlovsky, A. D.: Chronic Diphtheria of the Throat. (*Russki. Vratch.*, Vol. iv., No. 7, p. 109.)

The progressive recognition of atypical forms of diphtheria threatens to overthrow our current conceptions of the disease, and will probably result in a reclassification of this entire chapter.

Since Vieusseux reported 9 cases of "Croup Prolongé," numerous reports of "chronic diphtheria" have been published. These cases frequently present none of the typical features of diphtheria as we know it from the "classical" picture, and only the positive results of bacteriologic examinations expose the true nature of the disease.

Chronic diphtheria may manifest itself under many aspects: as laryngeal croup without fever and without general disturbance, as fibrinous rhinitis, as ozena, as conjunctival diphtheria, as pseudomembranous vulvitis, etc. Evidently the Klebs-Löffler bacillus may produce a whole series of affections, just as other bacteria. The unity of such a series is merely etiological, not clinical, and the author proposes the name "Diphtheromycosis" for this group, analogous to "Staphylomycosis."

Jukowsky, W. P.: Fatal Hemorrhage from the Liver in a Syphilitic New-born. (*Mediz. Obos.*, Vol. lxiii., No. 2, p. 106.)

The infant, apparently normal, died on the fourth day after a slight bleeding from the navel. The autopsy showed the cause of death to have been a profuse hemorrhage from the liver into the abdominal cavity. The liver and the other viscera showed unmistakable signs of congenital syphilitic cirrhosis and endarteritis. The case emphasizes the unreliability of external appearances, as the child seemed normal in every respect. Neither were any indications of maternal syphilis present. Death was probably the ultimate result of a slight traumatism leading to rupture of the extremely friable blood-vessels.

MEDICINE.

Hardy, Percy: An Analysis of 150 Cases of Death from Bronchopneumonia. (*The Lancet*, September 24, 1904, p. 885.)

The cases comprised all those children under thirteen years of age, who died from this cause and had postmortems in the East London Hospital from February 1, to December 31, 1903. As to sex there were 85 males and 65 females. There were 20 cases under 3 months, the youngest being 6 days old; there were 53 from 3 to 12 months old, making 73 under 1 year. From 1 to 2 years there were 46 cases, making the total under 2 years 119, out of the 150 cases studied. From a study of the previous modes of

feeding it was decided that the mortality from bronchopneumonia is nearly eight times as great in bottle-fed as in breast-fed children. Among the exciting causes the acute specific fevers held first place, measles, diphtheria and pertussis accounting for 34 cases. Other important exciting causes were cerebrospinal meningitis, suppurative otitis media, pyemia, anesthetics, typhoid, and scalds or burns.

A study of the morbid anatomy showed that both lungs were affected in 132 cases, the right or left lung alone in 9 cases each. Massive bronchopneumonia was present in 6 cases, in 2 of which nearly the whole of both lungs was solidified. Suppurative bronchopneumonia was found 15 times; in 4 cases with suppurative otitis media, in 4 cases with empyema (of these 2 with purulent pericarditis, also); in 2 cases with peritonitis; 3 were part of a general pyemia and 1 was associated with acute suppurative periostitis. Coexistent pleurisy was acute fibrinous in 15 cases, serous in 1 case and purulent in 16 cases. Of these last the empyema was on the right side in 6 instances, on the left in 8, and affected both pleuræ in 2 cases.

Wilson, J. C.: Cerebrospinal Fever, Epidemic Cerebrospinal Meningitis. (*Journal of the American Medical Association*, April 29, 1904, p. 1334.)

The author reviews the history, causes, symptoms and treatment of epidemic cerebrospinal meningitis, a disease which has at present a special interest on account of the lately occurring epidemic in New England and in New York. While it has been recognized for about a century, most of our knowledge of the disorder has been acquired of late years, and largely through the work of our countrymen, Councilman, Mallory and Wright. Councilman's recent paper (*Journal American Medical Association*, April 1, 1905) is referred to by Wilson. Formerly the communicability of cerebrospinal meningitis was doubted, but it is now admitted that, if the nose, ears or lungs are affected, it may readily be conveyed from one person to another. Second attacks are very rare; it is probable that one attack confers a persistent immunity. The germs are found only in connection with the lesions of the disease, but mixed infections are not uncommon. The symptoms are most diverse, there are no prodromes and the period of incubation is unknown. In the malignant cases the symptoms of inflammatory lesions of the brain and cord, and

those of a general malignant infection are both overwhelming. The author goes at some length into the description of the general symptoms and those of the anomalous types, the fulminant form, the abortive, the intermittent and the chronic types. Few diseases vary more in their severity and mortality, or are followed by more complications. The diagnosis may be difficult, but if meningitis be present, it is not usually embarrassing during an epidemic. In doubtful cases lumbar puncture should be resorted to, and the presence of the meningococcus in the cerebrospinal fluid ascertained. The differential diagnosis between this form and tuberculous meningitis may, in some cases, be far from easy without this. The mortality of different epidemics varies between 20 and 75 per cent.; the average is estimated by Wilson as near 40 per cent. In the mildest cases no treatment is required; in the malignant ones none is effective. Quiet, nutritious diet, cold applications to the head and spine, laxative doses of calomel in the beginning of the attack, and opium, are recommended, the last named drug being regarded as indispensable. For prophylaxis, cleanliness and avoidance of overcrowding in times of epidemics, isolation and sterilization measures, and in case of successive attacks in the same family, abandonment of the dwelling and thorough disinfection are advised.

Davy, Henry: Fever in Children Caused by the Ingestion of Certain Kinds of Carbohydrate Foods. (*The Lancet*, September 24, 1904, p. 882.)

Nine cases of rapid rise of temperature in children after the ingestion of starchy puddings, of insufficiently cooked cereals, potatoes and carrots, and of fruit jams are described. The author holds the view that the temperature is due to the absorption of the products of fermentation rather than the slight gastric and biliary catarrh, as Eustace Smith maintains. Careful regulation of the diet and hygienic measures prevented recurrences.

De Muls: Hemorrhoids in Children. (*La Pathol. Infant.*, December 15, 1904, p. 281.)

Hemorrhoids are relatively rare in children. They may be internal or external; the former may occasion anal hemorrhage during the first months of life. Hemorrhage is unaccompanied by pain. Internal hemorrhoids are more frequent in childhood. They may exist without hemorrhage; in such case they are latent and only become apparent upon rectal palpation. Comby claims that

if rectal examinations were made oftener hemorrhoids would be found quite frequently in young children. Hemorrhoids are hereditary and are traceable to arthritic affections. They may alternate with gout, rheumatism, asthma and migraine.

Houzel groups the causes under three heads:—(1) Occasional causes resulting from venous compression due to tumors, such as sarcoma of the kidney, and habitual constipation. Affections of the respiratory and circulatory systems. (2) Efficient causes traceable to irritation due to pruritus ani, oxyuris, or rectal polypi. (3) Finally, immediate causes due to infections involving fissures or excoriations. Also nervous or vasomotor affections.

Subjective symptoms are practically absent. Smarting about the anus or anal tenesmus may be experienced. The objective symptoms do not differ from those in the adult. Hemorrhage is seldom abundant in children. Diagnosis is simple and the prognosis is favorable. Nevertheless spontaneous cure does not occur, and the lesion usually persists to adult life. Surgical interference may be necessary.

Lunz, R.: A Case of Gout in a Child of Seven Years.*
(*Gaz. Méd. Belge*, November 24, 1904, p. 80.)

As typical gout is extremely rare in childhood, the case of a boy of seven years, published by Dr. Lunz, is of special interest. Paroxysms of pain occurred two or three times a month. They came on suddenly during the night. The patient complained of pain in his limbs, especially the hands and feet. Toward morning the pain diminished considerably and disappeared in the course of one or two days. In the intervals the boy felt quite well. One morning after a severe attack, typical tophi as large as peas were found at the phalangeal articulations of both hands. The skin covering the articulations was normal and there was no tenderness on pressure, but passive as well as active motion proved somewhat painful. There was nothing abnormal about the toes, except that slight pain accompanied motion. The urine, of a specific gravity of 1.023, was strongly acid; microscopically many amorphous urate and calcium oxalate crystals were found, otherwise it was negative.

From an etiologic point of view it is noted that the child was weakly and very anemic and lived in wretched surroundings. The father suffered from pulmonary tuberculosis and died young.

*Abstract from the *Deutsche Med. Wochenschrift*, August 11, 1904.

Large doses of the alkalies were given, and the concretions disappeared in about ten days; the paroxysms diminished in intensity and gradually became less frequent.

Valagussa, F.: A Case of Lobar Pneumonia Returning at Long Intervals. (*Rev. Mens. des Mal. de l'Enf.*, June, 1904, p. 245.)

A brief history of the case is as follows:—A breast-fed child had an attack of bronchitis at four months, from which it completely recovered. When seven months old, the child had a retropharyngeal abscess which was opened. The pus was not examined. At ten months, an attack of enteritis occurred. Two or three months later, in January, 1903, the baby had a lobar pneumonia at the base of the left lung. A puncture was made and Fraenkel's bacillus was found. In May, a fresh attack of enteritis occurred, immediately followed by lobar pneumonia. In June, more enteritis, with pneumonia of the upper and lower lobes of the right lung. Fraenkel's bacillus again present. In July, enteritis with a left basal pneumonia. Rachitis symptoms now showed themselves. In October the child had another attack of pneumonia of the left lower lobe. He now was markedly anemic, suffered from rachitis, and from repeated attacks of gastroenteritis.

Valagussa explains the pathogenesis of the case as follows:—The receptivity of the subject; the feeble resistance of the buccal and laryngopharyngeal mucous membranes to the germs; repeated passage of the pneumococcus into the lymphatics and invasion of the bronchial glands, where they lodged; weakening of resistance in the subject by the repeated gastrointestinal attacks, with a simultaneous invasion of the lung by the pneumococcus through the general circulation.

Hutinel, V.: Anasarca in the Severe Enterocolitis of Young Children. (*Rev. Mens. des. Mal. de l'Enf.*, July. 1904, p. 289.)

Hutinel gives in detail the history of 3 cases of enterocolitis with anasarca. These histories he considers typical. In nearly all cases of this kind seen by him there was at first a simple gastroenteritis, due to undigested milk. The milk was continued, and a grave enterocolitis supervened, lasting weeks or months. The anasarca began as a local edema of the face or limbs and then became general. In 2 of the reported cases, the edema ap-

peared after lavage of the intestine with salt solution and, also, when salt was added to the babies' food. When the ingestion of salt was stopped and a watery diet instituted, the edema decreased and finally disappeared. In the third case the anasarca was accompanied with a purpura. Here a fluid diet and enema of plain water were used. The edema disappeared gradually and the weight of the child decreased. When the child was nearly well, different doses of salt were added to the food. The child's weight did not increase and the anasarca did not reappear.

For edema to appear there must be either a disturbance of the vascular system, the kidneys must be at fault, or the nutritional exchanges must be upset. In none of Hutinel's cases were there any signs of heart or kidney disease. He thinks that, owing to the infection of the intestine and to the loss of albumin (shown by its non-digestion in the stools), a sort of cachectic state is set up in these babies, with a grave alteration of the nutrition. In some, as yet unexplained way, there is a fixation of water in the tissues due to the retention of sodium chlorid. When the child becomes able to digest the proper elements, the nutritional exchanges are re-established, and the sodium chlorid, even if administered in excess, is eliminated as a foreign body.

SURGERY.

Holding, Arthur F.: Removal by Gastrotomy of a Hatpin Swallowed by a Twenty Months' Old Child. (*Annals of Surgery*, September, 1904, p. 354.)

A girl baby, twenty months old, was playing on the bed with her mother's hat in which were three hatpins. In her play the child fell forward, and after some time the mother's attention was called to the child by hearing it cough. Search was made for something that might have been swallowed, but nothing was thought of. From that time, however, it was noticed that whenever the child stooped to pick anything up from the floor she held her body stiff, and, moreover, complained of pain whenever the body was bent. For three days the temperature ranged between 100° F. and 101° F. During this time the third hatpin was missed. Nine days after the first symptom the right arm was noticed to be colder and on the tenth day the child passed a thin film of blood clot with a stool. On the twelfth day a skiagraph of the child's body was taken. This revealed the hatpin head

downward, extending from the third lumbar vertebra on the left to the second dorsal vertebra on the right. On the fifteenth day by gastrotomy, under ether, the pin was removed. The child made an uneventful recovery.

Halipré, A.: Does Painful Paralysis Exist in Young Children? (*Rev. Mens. des Mal. de l'Enf.*, June, 1904, p. 241.)

The author believes that the so-called painful paralysis of children is not a true paralysis, but a functional disturbance. Accordingly he prefers to call it the painful torpor of children—a name also suggested by Chassaignac. Halipré cites 3 cases in each of which the histories are similar. A child, under three years, fell, cried with pain and held its arm immobile and hanging down in a slightly flexed position. There was tenderness over the elbow which appeared to be in good position. There was pain on supination and pronation. On making these motions, a sudden crackling noise was heard, apparently at the head of the radius. The child stopped crying and immediately began to use its arm. Halipré believes that there was in his cases, and is in most others, a surgical cause for this impotence of the limb—usually the upper one. The child immobilizes the limb exactly as does an adult who is suffering from a sprain or dislocation. Probably the surgical injury is not the same in all cases, but the writer thinks that these “painful torpors” have a surgical, and not a nervous, origin.

Mathews, Frank S.: Pneumococcus Peritonitis. (*Annals of Surgery*, November, 1904, p. 698.)

Five personal cases are reported, and the conclusions are in accord with those of Jensen and von Brüns. The disease is rare as compared to other forms of peritonitis, but occurs three times as frequently in children as in adults. Under fifteen years it is seven times as frequent in girls as in boys. The pathology of the disease is similar to that of pneumococcus empyema. The exudate is greenish yellow and very fibrinous; it may be practically solid, or fluid, with large masses of fibrin. One to four litres of pus have been evacuated in reported cases. The process tends to become localized in the pelvis or hypogastric region, forming large, thick-walled abscesses, but it may be diffuse covering the whole peritoneum. Many cases are discovered only at the necropsy: some have ruptured at the umbilicus; of those incised for hypo-

gastric abscess a large proportion have recovered. The associated lesions are:—Empyema, pneumonia, pericarditis, otitis media and intestinal involvement. In the majority of cases the peritonitis has appeared to be primary, without history of pneumonia or pneumonitis at postmortem.

The symptoms of the apparently primary cases are quite characteristic. There is sudden onset with high temperature, vomiting which continues one or two days, tenderness and distension. There is but little muscular rigidity, pain and distension as compared to other forms of peritonitis. Diarrhea is the rule in the next stage of the disease, the vomiting having ceased and the fever abating. Appetite returns and the child looks better. Next there is usually an increase in the exudate, forming a tense cystic mass in the lower abdomen, the fever returns with marked hectic curve; cachexia ensues and the case terminates in from one to four months in death from exhaustion, or in recovery after perforation at the navel or after operation. The diffuse form is apt to terminate fatally, but the localized form is less severe, and if operated upon 80 per cent. recover.

Differential diagnosis must be made in the later stage from tuberculous peritonitis; in the diarrheal stage, typhoid fever must be excluded: in the early stage from appendix peritonitis and later from gonococcus peritonitis. The modes of infection, as quoted from Jensen, may be through a wound, through the diaphragm, through the genitals, through the intestinal tract, through the blood, and from pneumococcic foci in the abdominal organs.

HYGIENE AND THERAPEUTICS.

Nobécourt, P. and Vitry, G.: The Influence of Sodium Chlorid on Infants. (*Rev. Mens. des Mal. des l'Enf.*, March, 1904, p. 120.)

To test the influence of the ingestion of small quantities of sodium chlorid on the weight of babies, experiments were instituted by Nobécourt and Vitry. The infants were all breast-fed, varying from twelve days to four months of age. The daily doses of the salt given in boiled water were 0.25, 0.50, and 1.0 grams, respectively. Sixty-four per cent. of the whole number of babies increased in weight, while the salt was given and 36 per cent. showed a slight decrease. Further, of the babies weighing less than 2,500 grams, 71 per cent. showed a decided increase in

weight. In 3 cases of abundant diarrhea the salt was given, and these babies instead of losing weight, as is usual during these attacks, were found to have gained. The experiments showed that the dose of sodium chlorid giving the best results was 1 centigram for every 100 grams of the child's weight.

The authors found it difficult to explain the exact cause of the increase in weight obtained by the addition of salt to the infants' diet. It did not appear to be due to an increased appetite, as the babies took no more milk with the salt treatment than without. They did not attempt to measure the total urine in such small babies, and so they were unable to say whether the increased weight was due either to a larger excretion of urea, or to a retention of sodium chlorid in the system due to insufficient renal elimination. These two latter theories have been advanced by Bunge and Beaunis. If there was retention of water in the body, it must have been in the tissues, as the blood showed no diminution of red corpuscles. Possibly a retention of water in the tissues explained the increase in weight.

Rollet, Étienne: Keratitis of Heredosyphilitics and its Treatment. (*Rev. Mens. des Mal. de l'Enf.*, May, 1904, p. 229.)

Rollet believes that there are three varieties of the so-called heredosyphilitic keratitis. The first is a mild interstitial keratitis, occurring in the child of a cured syphilitic. The keratitis is accidental, as it were, and could as well have occurred in the descendant of a nonsyphilitic. The second variety occurs in a child or adolescent who has marks of a late hereditary syphilis, but who is not suffering from active leucic lesions. The third variety of keratitis is one of the lesions of an active hereditary syphilis. It is found usually in a young child and is more severe than either of the other forms.

From this classification, it follows that the first two forms of keratitis will be in no wise benefited by antisypilitic treatment, while the third variety will be. Local treatment, however, will benefit all three forms. Rollet has found that the subconjunctival injection of methylene blue, or an oily preparation of biniodid of mercury give remarkable results. The methylene blue is very diffusible and is painless. The biniodid has an energetic action, but the irritation caused is very slight. Either of these solutions is injected every second day just in front of the insertion of each of the four recti muscles. These injections have both a mechanical and microbic action in the corneal spaces.

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Original Communications.

ETIOLOGY AND CLASSIFICATION OF THE SUMMER DIARRHEAS IN INFANCY.

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The present state of our knowledge of the summer diarrheas in infancy is largely due to the recent studies of the rôle of the bacillus dysenteriae as an organism infecting the intestine, the results of these studies being embodied in the recent Report on the Diarrheal Diseases of Infancy from the Rockefeller Institute for Medical Research. Through the work of Flexner, and the men working under his direction, the pathogenicity of this organism or group of organisms has been definitely established. Various organisms, isolated in various localities, which differed in certain minor cultural characteristics from the original Shiga bacillus, and which were at first regarded as pseudodysentery bacilli, have been shown to be merely varying closely related types of one group, having important cultural characteristics in common, common pathogenic powers, and the power of producing common agglutinins in the blood of infected animals. This organism or group has been proved to be the specific cause of the acute dysentery of adults.

In regard to the infantile diarrheal diseases, it has been shown that out of 412 cases examined during the summer of 1903, the bacillus dysenteriae in its varying types was present in 279, or 63.2 per cent. of all the cases examined. Undoubtedly the variations in the percentages obtained by the various investigators were due in part, as pointed out by Flexner, to variations in the

skill and methods of the several individual investigators. Duval and Shorer, who in New York obtained the highest percentage, isolating the bacillus dysenteriae in 75 out of 79 consecutive cases of diarrheal disease, or 94 per cent., had had a particularly wide experience in the isolation of this organism. The second highest percentage was obtained by Kendall in Boston, who isolated the organism in 29 out of 31, or 93.5 per cent. of the cases investigated at the Floating Hospital. His studies were, however, not made upon consecutive cases, but upon the severer cases supposed to be more favorable to the successful isolation of the organism. These results establish the fact that the bacillus dysenteriae is present in a very large proportion of these cases, and suggest that it might be found present in all cases, if the search were carried far enough. In many of the reported cases the examination of many plates, and of a great number of colonies was necessary, before a positive result could be obtained. It seems plausible to conceive the possibility that, if the investigation of the negative cases could have been carried to a still greater extreme, positive results might finally have been obtained.

The question suggested by these results is, how far the constant, or almost constant, presence of this organism in the intestine of children suffering from diarrheal disease is evidence that it is a specific cause of the disease. It has long been known that other pathogenic organisms may be found in the intestine, without evidence of an actual infection. Is it not possible that the bacillus dysenteriae, as suggested by Flexner, may have a frequent saprophytic existence in the intestine without pathologic significance? This bacillus, although not found in the majority of the cases, where the stools of healthy infants have been examined, was found by Duval in very small numbers in the stools of two healthy, milk-fed children. It seems possible that its presence may have the same significance as that of the pneumococcus in the air passages, and that, like the pneumococcus, it may, under certain circumstances, assume a pathologic rôle through autoinfection, rather than through infection from without.

That in a certain number of cases the bacillus dysenteriae does assume a pathologic rôle, seems, from the Report, to be indisputable; for, as pointed out by Flexner, the development of specific agglutinins in the blood, the increasing number of the

organisms in the discharges, and their close relationship to the intestinal mucosa—the organisms being obtained most readily from the deeper tissues by scrapings of the mucous coat—afford ample proof of its pathogenic action in these cases. Flexner concludes, however, that “Whether in every instance in which it is found it is to be regarded as the prime, or even proximate, cause of all existing intestinal lesions are questions to which the final answers are not yet to be given.”

If the presence alone of the organism does not constitute a proof that it is the cause of any given case of infantile diarrhea, what further evidence do we need to establish such proof? Further evidences adduced that a true infection occurs, are the presence of the organism in the tissues, and the presence of a specific agglutinin in the blood of the patient. The cases in which the presence of the organism in the tissues can be demonstrated are too few in number to afford any basis of conclusion as to the frequency of true infection. Nor does the Rockefeller Report afford a basis of conclusion from the frequency of a positive agglutination reaction with the blood, because many of the observers were unable to carry out the agglutination tests. Duval and Bassett, in the investigation in Baltimore in 1902, studied the agglutinating power of the blood of the infants affected. They do not state the exact number of cases in which the blood of a patient agglutinated the organism isolated from the stools of the same patient, but report 39 cases as having agglutinated a culture of the Flexner (Harris) type of organism. They investigated 53 cases in all. These cases, however, appear to have been more in the nature of an epidemic. Wollstein, who investigated 62 cases, tested the blood reaction in but 9, of which 7 were positive. Cordes examined the blood reaction in 22 cases in which the bacillus dysenteriae was found; with 10 positive and 12 negative results. Bassett found the agglutination reaction in 1:20, or higher dilution positive in 30, and negative in 10, out of 40 cases in which the specific organism was isolated. He found it, also, in 1:50, or higher dilution positive in 5, and negative in 10, out of 15 cases in which the specific organism was not isolated. In 3 of these 5 positive reactions the dilution was as high as 1:5000. Winne, in the routine examination of the blood of 100 cases of summer diarrhea, found the reaction positive in 45, and negative in 55. Of these 100 cases, 40 showed

the presence of the bacillus in the stools, with 26 positive and 14 negative agglutination reactions. The remaining 60 cases, in which the bacillus was not isolated, showed a positive reaction in 19, and a negative reaction in 41 cases. These latter cases were classified as dyspeptic diarrhea, simple diarrhea, ileocolitis, malnutrition, and marasmus.

The above findings seem of little or negative value, as bearing on the question of the frequency of true infection with this organism, from the comparatively small number of cases studied. Moreover, it has not been possible to determine in how high a dilution a positive reaction should be regarded as a positive evidence of infection, a question which could be settled with absolute certainty only by tabulating the limits of dilution in cases where there is a certainty of true infection furnished by obtaining the organism from scrapings of the tissues, and it has not even been settled whether or not a positive agglutination reaction in the blood may result from the absorption of products of the specific organism, without true infection of the tissues.

Howland's report on the anatomical findings in autopsies of fatal cases where the bacillus dysenteriae was found, shows that a great variety of lesions may be present in such cases, but that no one type is characteristic.

The clinical reports assume that all cases in which the bacillus dysenteriae was isolated, were infections with this organism—caused by it. According to the conclusions of Flexner this assumption is unwarranted. The reports also are confined to cases where the organism was found, and thus afford no basis for comparing the relative frequency of particular characteristic clinical types, with cases where negative bacteriologic findings were obtained. Holt's conclusions show that a great variety of clinical types, from the mildest intestinal disorders to cases of great severity with marked local and constitutional symptoms, may be associated with the presence of the bacillus dysenteriae. He also concludes that the relative frequency of infection with the bacillus cannot be definitely stated from the reports. He regards the most characteristic clinical type as the acute febrile, with stools containing much mucus, and streaked with blood, and proposes the term *Infantile Dysentery* for such cases.

I shall refer, subsequently, in greater detail to the clinical reports, in comparison with my own clinical observations.

QUESTIONS SUGGESTED BY THE PRESENT STATE OF OUR KNOWLEDGE.

This great advance in our knowledge of the infantile diarrheas, from the standpoint of bacteriology, should not lead us to neglect other long-recognized factors in their etiology. The modern tendency toward classifying disease types upon an etiologic basis, which finds its expression in the continual attempt to separate such types by bacteriologic proof, into the class of specific infections, is apt to lead us to exaggerate the rôle of bacteria in all pathologic conditions. In the attempted classification of the infantile diarrheas, the very fact that we retain such terms as summer diarrhea, dyspeptic diarrhea, and intestinal indigestion, points toward the existence of other etiologic factors, as improper food, and the heat of the weather. It is known that these factors can produce an attack of diarrhea. It would seem, therefore, of the first importance to consider these etiologic factors, especially their relative importance as compared with infection by specific pathogenic organisms.

Another obstacle to advance in the knowledge of the infantile diarrheas, is the great confusion which exists in their terminology. A great variety of terms is used in describing these conditions, so that when one observer wishes to state that a certain clinical picture is or is not associated with infection with a certain organism, he may or may not convey a definite picture to the mind of another observer. One observer, for example, in describing the investigations of a certain summer, stated that the bacillus dysenteriae was usually present in cases of summer diarrhea, but absent in cases of dyspeptic diarrhea. One wonders what is his distinction between summer diarrhea and dyspeptic diarrhea occurring in the summer. An observer accustomed to another terminology might speak of fermental diarrhea, and another of acute gastro-enteric intoxication. If the infantile diarrheas could be separated into fairly distinct clinical types, upon a fairly definite symptomatic basis, it would be much more convenient in subsequently classifying the disease upon an etiologic basis, and we should at least be better able to determine how far there is any relation between clinical picture and etiologic factor. Such a clinical classification should be based on a rather large number of cases.

With this idea in mind, I have, during the past two summers, paid especial attention to the cases of summer diarrhea, my sum-

mer term of service at the hospital affording a favorable opportunity for such study. Particular attention was paid to completing the clinical histories, to verifying the statements of the parents, and to obtaining accurate weight and temperature records. From these records I have collected data from all the cases coming to the Out-Patient Department of the Thomas Morgan Rotch, Jr., Memorial Hospital for Infants during the months of July, August, and September, in 1903 and 1904. These data represent 620 consecutive cases. The studies are necessarily partially incomplete, from the fact that the material was drawn from an Out-Patient Clinic, but only in this way could so large a number of cases be studied.

STATISTICS OF 620 CONSECUTIVE CASES.

Certain points in the clinical histories could not be verified, as, for example, the daily number of stools, and the existence of fever previous to the child being brought to the hospital. The mother's answers in these respects are probably often extremely inaccurate, and the figures are given under this reservation. Statements as to colic, vomiting, and duration of illness, are probably more accurate, but are only included when clear and intelligent answers were obtained. The statements as to the appearance of the stools were usually verified by actual observation.

Feeding.—The feeding of the child at the time of onset of the diarrhea is important in relation to the question of etiology. The rôle of any particular food as a factor in etiology cannot be determined from these figures, as the number of cases which developed diarrhea, as compared with the whole number of cases fed on a particular food, is not shown. But the number of cases fed on foods presumably sterile, which developed diarrhea, will naturally throw some light on the question of bacterial infection from without. All children who were given anything besides milk, or some one particular patent food, are classified under the heading of weaned. This includes most of the cases that occurred in the second year, as well as many of those in the first year. Very few cases not weaned were given any water, in addition to the milk or patent food. The term sterile is not to be taken in the strictest and most literal sense, as it refers to foods which had been boiled, or pasteurized at 155°F.

PREVIOUS FEEDING.

(A) Presumably not Sterile.

Weaned	244 cases
Cow's milk, diluted or not diluted, not pasteurized	128 "
Condensed milk, water not boiled	44 "
Home modification, arranged at hospital, not pasteurized	2 "
Mellin's Food	11 "
Eskay's Food	2 "
Ridge's Food	1 "
Breast, with additional water not boiled	2 "
<hr/>	
Total	434 cases

(B) Presumably Sterile.

Breast, with no additional water	99 cases
Walker-Gordon laboratory milk, heated to 155°F.	26 "
Home modification, heated to 155°F.	30 "
Peabody house milk (pasteurized and modi- fied)	12 "
Malted milk (made with boiling water)	8 "
Boiled cow's milk	1 "
Barley water alone	3 "
<hr/>	
Total	183 cases

Age.—All of the cases studied were under two years of age. The frequency of occurrence of summer diarrhea in the different periods of infancy is shown by the following table:—

Birth to 3 months	71 cases
3 to 6 "	94 "
6 to 12 "	212 "
12 to 24 "	243 "

Duration of the disease before coming under observation was as follows:—

24 hours, or under	49 cases
24 hours to 48 hours	59 "
3 days to 6 days	172 "
1 week to 2 weeks	135 "
2 weeks to 4 weeks	103 "
1 month or over	46 "
History unsatisfactory	56 "

Onset.—The onset was sudden, the diarrhea and other symptoms showing no subsequent increase, in 438 cases. It was gradual, with increasing severity of diarrhea and other symptoms, in 115 cases. The history was unsatisfactory in 67 cases.

Number of Movements.—No case was included as one of diarrhea, unless the patient had three or more movements a day, of an abnormal character. The severity of the cases as judged by the frequency of the movements, may be seen in the following table. For these figures I was obliged to depend on the statements of the mother, and they are probably only approximately correct, owing to the tendency on the part of the mothers in many cases, to exaggerate the symptoms. Each mother was carefully cross examined, and the final result accepted under reservation. Nine cases were thrown out, as the mothers' statements were obviously so untrue, that no conclusions could be reached.

AVERAGE NUMBER OF MOVEMENTS IN 24 HOURS.

3 - 6 inclusive	254 cases
7 - 10 "	210 "
11 - 19 "	99 "
20 - 40 "	39 "
Over 40 "	9 "
Answers obviously false	9 "

Character of the Stools.—In the Report of the Rockefeller Institute, practically the only attempt at clinical classification was based on the character of the stools. Especial attention was paid to the presence of blood, and of considerable quantities of mucus, in the cases where the bacillus dysenteriae was found, and the presence of blood and mucus is by some observers considered to be more characteristic of dysentery infection, than any other particular clinical symptom. In my investigations, the greatest pains were taken to obtain specimens of the stools, and accurately to record their appearance. Most of the stools were loose in consistency.

(A) No curds, mucus, nor blood.

(1) Yellow, loose, but otherwise normal in appearance	27 cases
(2) Green and yellow	14 "
(3) Green	42 "
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Total	83 cases

(B) With curds, no mucus, nor blood.

(1) Yellow	19 cases
(2) Green and yellow	15 "
(3) Green	39 "
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Total	73 cases

(C) With mucus and curds, no blood.

(1) Yellow	24 cases
(2) Green and yellow	30 "
(3) Green	110 "
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Total	164 cases

(D) With mucus, no curds, no blood.

(1) Yellow	8 cases
(2) Green and yellow	14 "
(3) Green	40 "
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Total	62 cases

(E) With blood specks, curds, and mucus.

(1) Yellow	0 cases
(2) Green and yellow	6 "
(3) Green	20 "
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Total	26 cases

(F) With blood specks and mucus, no curds.

(1) Yellow	2 cases
(2) Green and yellow	5 "
(3) Green	17 "
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Total	24 cases

(G) With blood streaks and mucus, no curds.

(1) Yellow	3 cases
(2) Green and yellow	3 "
(3) Green	18 "

Total 24 cases

(H) With excess of blood and mucus.

(1) Yellow	0 cases
(2) Green and yellow	2 "
(3) Green	0 "

Total 2 cases

(I) No fecal matter, no blood.

(1) With curds and mucus	8 cases
(2) With mucus only	6 "

Total 14 cases

(J) No fecal matter. With blood and mucus.

(1) Specks of blood	3 cases
(2) Streaks of blood	16 "
(3) Excess of blood	5 "

Total 24 cases

Total number with blood 100 cases

" " " mucus 334 "

" " " curds 271 "

" " fecal only, without blood,

curds, or mucus 83 "

" " yellow (normal color) 83 "

" " green and yellow 89 "

" " green 286 "

" " without fecal matter 38 "

Colic.—For the figures as to the occurrence of abdominal pain, I was obliged in most cases to rely on the statements of the mothers. Only those answers were accepted which stood the test of rigid cross examination, and very many of the answers were unsatisfactory.

Present	147 cases
Absent	210 "
Answers unsatisfactory	263 "
Especially noted as severe	10 "

Vomiting.—Here the statements of the mothers are probably more reliable.

Present	313 cases
Absent	279 "
Answers unsatisfactory	28 "
Especially noted as severe	26 "

Loss of Weight.—The statement of the mother was only accepted when she volunteered the statement that the child had lost in weight. In many of the cases, weight observations which were being made regularly at the hospital, in connection with the feeding, afforded a reliable basis of conclusion.

Present	136 cases
Absent	47 "
Answers unsatisfactory	437 "
Especially noted as severe	59 "

Fever.—The temperature of all cases was observed at the first visit. As to the previous existence of fever, I was obliged to rely on the statements of the mothers in most cases, subjected to the usual careful cross examination.

At onset.

Present	152 cases
Absent	254 "
Answers unsatisfactory	214 "

At onset only	52 cases
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At first visit.

Present	105 cases
Absent	515 "

Developed after first visit	6 cases
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Total number observed with fever	111 cases
" " " without "	509 "

Of these cases with fever at the first visit 93 also had fever at the onset, 12 were said to have had no fever at the onset, but developed it subsequently.

TEMPERATURES OBSERVED (RECTAL).

99° - 99.8°F.	14 cases
100° - 100.8°F.	47 "
101° - 101.8°F.	19 "
102° - 102.8°F.	15 "
103° - 103.8°F.	13 "
104°F. or over	3 "

DURATION OF FEVER BEFORE OBSERVATION.

24 hours or under	16 cases
24 - 48 hours	19 "
3 - 6 days	32 "
1 - 2 weeks	20 "
Over 2 weeks	7 "
Answers unsatisfactory	17 "

The persistence of fever could not be determined, as the patients could not be made to report at the hospital every day, and frequently never returned. The persistence was noted as far as was possible, and the figures are given for what they are worth.

PERSISTENCE OF FEVER.

Less than 24 hours	4 cases
" " 2 days	8 "
" " 4 "	8 "
" " 1 week	12 "
" " 2 weeks	4 "
At least 24 hours	6 "
" " 2 days	13 "
" " 4 "	9 "
" " 1 week	10 "
" " 2 weeks	1 "
Over 2 weeks	5 "
Not observed	49 "

Course and Prognosis.—The course and subsequent history of many of the cases could not be followed. In general, however, the mothers were more faithful about returning than might be expected. Cases were classified as making an immediate recovery, when the diarrhea had disappeared under treatment inside of two days; and as making a rapid recovery, when the symptoms disappeared inside of a week. Cases where the symptoms

persisted for more than a week, but in which eventual full recovery occurred, were classified as making a gradual recovery. As to the treatment employed, I shall in a subsequent paper give the details of the results obtained by the comparison of treatment and result in this series of cases. It may have influenced the present figures, but only to a slight extent. All cases were given an initial dose of calomel or castor oil, followed by twenty-four to forty-eight hours' starvation, and then the giving of a weak food. In most cases small doses of bismuth were employed, and cases where rapid improvement did not occur were further treated by daily irrigation of the colon.

RESULTS.

Immediate recovery	199	cases
Rapid "	101	"
Gradual "	58	"
Improved	30	"
No improvement	17	"
Died	9	"
Not observed	206	"
Total recovery	358	"
" rapid recovery	300	"
" no improvement	26	"

CLINICAL CLASSIFICATION OF 620 CASES.

The cases tabulated above present a great variety of clinical pictures, varying from a mild diarrhea of brief duration, with loose but otherwise normal dejecta to the gravest cases, with high and prolonged fever, and evidences of marked changes in the intestinal mucosa. On examining the individual records, one is struck by the fact that the large majority of cases differ in no important respect from the cases of acute indigestion occurring in colder weather. Others conform to the recognized type characterized as acute nervous diarrhea, in which there is evidence neither of infection nor of indigestion. The variations in the clinical pictures are, however, not merely of degree. A certain type of case stands out repeatedly from the others as especially distinct. These are the cases characterized by the existence and persistence of fever. They have notably the recognized characteristics of true infections, with more marked constitutional symptoms, and a slower recovery than the majority of the cases. The existence

and persistence of fever, seems to afford the most promising basis for a clinical division of the cases, and to these cases we may give the name of acute intestinal infection.

The cases that were observed to show fever of brief duration at the onset only are not included in this category. None of the cases in which the fever appeared at the onset, and fell to the normal within twenty-four hours, resembled the cases in which the fever persisted, and they will be described under a different heading.

In spite of the apparent absence of definite characteristic symptoms in the remaining afebrile cases, a second distinct clinical picture appears, when we study the records of a large number of cases. There appear certain cases of a very mild character, and brief duration, with loose, but otherwise well-digested stools, of normal yellow color, and normal odor, containing no curds, mucus, nor blood. In these cases there is no evidence pointing either to infection or to indigestion. They are analogous to the long-recognized cases of diarrhea which follow nervous influences, as fright, or exposure to heat and cold. To these cases the name of acute nervous type may be given.

In the remaining cases, the chief notable feature is their close resemblance to the well-recognized acute or chronic intestinal indigestion which occurs at all times of year. Lacking the clinical evidences of infection, they differ in no way from cases of indigestion, except in the greater proportion of acute cases, and their great prevalence in hot weather. To these cases the name of indigestion type may be given. They may be further subdivided into two groups. In one the presence of curds and undigested masses in the stools is a prominent feature. It would seem a plausible hypothesis that the irritation of these masses is the immediate cause of the diarrhea, and to this group the name irritative may, for convenience, be given.

In the second group, fermentation in the intestinal contents, as shown by the green color, and foul or sour odor of the stools, is the prominent feature, and to this group the name fermental may be given. Although the typical irritative case has yellow stools, with curds, and normal odor, yet the characteristics of these two groups are frequently combined. I shall, for convenience, classify as irritative all cases where curds and undigested masses were present in the stools, whether or not there

were also evidences of fermentation, and as fermental those cases in which the evidences were of fermentation alone.

In order still further to clarify the description of these types, the following table is of value. It shows the percentage of each type which was noted to have particular clinical symptoms, most of which were in some measure common to all types. For the purposes of this table, only positive answers are included, or, in the case of the stools, actual observation. When a satisfactory answer was not obtained it was not included in reckoning the total.

	Nervous.	Fermen- tal.	Irrita- tive.	Infec- tious.	Unclass- ified.
Number of cases	37	170	266	111	36
Per cent. of whole number..	6%	27%	43%	18%	6%
Onset Acute	81%	73%	66%	100%*	76%
Brief initial fever only ...	8%	19%	10%	0%	4%
Colic	24%	25%	20%	33%	16%
Vomiting	43%	49%	45%	68%	44%
Loss of weight	10%	23%	19%	28%	16%
Mucus in stools	0%	53%	67%	78%	12%
Blood in stools	0%	13%	12%	42%	0%
Immediate recovery	50%	35%	34%	11%	40%
Rapid "	17%	15%	14%	25%	16%
Gradual "	3%	10%	7%	20%	4%
Improvement only	0%	5%	5%	7%	0%
No improvement	0%	$\frac{1}{2}$ %	3%	6%	4%
Death	0%	$\frac{1}{2}$ %	1%	5%	4%
Did not return	30%	34%	37%	26%	32%

THE INFECTIOUS TYPE.—It has been frequently assumed that blood in the stools, that is to say, evidences of ileocolitis, are, when present, characteristic of an infectious type. My figures show that this is not absolutely the case. There were 111 cases of the infectious type observed, out of a total of 620 cases. Of these 111 cases, 46 showed blood in the stools, or 42 per cent. Of the remaining 509 cases of other types, 54 showed blood in the stools, or 10½ per cent. It is thus to be seen that blood may occur in noninfectious types of summer diarrhea, but is more apt to occur in the infectious type in the proportion of about 4 to 1. Moreover, in nearly all the cases of the infectious type, the blood

* This refers to the onset of fever, not of diarrhea.

appeared early in the course of the disease; whereas, as will be seen below, in the noninfectious types, the blood appeared usually after a more or less prolonged course of diarrhea. Also, when the blood appeared in marked excess, the cases were clinically always of the infectious type. Out of 47 cases in which more blood than mere specks was present, 28, or about 60 per cent., were of the infectious type.

It was noticed that in most of the cases in which mucus was noted in marked excess in the stools, the cases were of the infectious type. The presence of mucus seems to be a usual symptom of this type. Out of the 111 cases, mucus occurred in 86, or 78 per cent. In the remaining 509 noninfectious cases, mucus was noted in 258, or about 50 per cent.

All the cases in which the stools contained only blood and mucus, or mucus alone, 30 in number, were febrile cases.

We may conclude that a tendency toward the early development of ileocolitis, as shown by the presence of blood and an excess of mucus in the stools, is one of the special characteristics of the infectious type of summer diarrhea.

The majority of the histories obtained as to colic and loss of weight, were too unsatisfactory to afford a basis of comparison between the infectious and noninfectious types of diarrheal disease. Colic was often present and often absent in all types. Loss of weight was notably rapid in all infectious cases that remained under observation, and was never noted as absent. Vomiting was present and absent in all types, but present in 68 per cent. of the infectious type, and in 47 per cent. of the other types.

Of the febrile cases, 84 were "primary," that is, showed fever and constitutional symptoms at the beginning of the diarrhea; 27 developed febrile and constitutional symptoms subsequently to a period of indigestion.

As to prognosis, it appears that while in all types the prognosis is favorable, and the disease tends toward a rapid recovery under treatment, the noninfectious types are more favorable, and tend toward a rapid recovery in a greater proportion of cases, than the infectious type. A glance at the table, showing the decrease in the percentage of very rapid or immediate recoveries, and the increase in the percentage of cases, showing improvement only, no improvement, or having a fatal issue, in the infectious type, will be convincing as to this point. If the noninfectious

cases of all types be compared with the infectious cases, the figures are as follows:—

	Noninfectious.	Infectious.
Rapid recovery	50%	38%
Gradual recovery or improvement only	12%	30%
No improvement	2%	12%
Death	$\frac{6}{10}\%$	6%

Great variations are observed in the severity of the infectious cases. In all cases, the onset of fever is abrupt. In most cases it accompanies the diarrhea. In some it precedes the diarrhea by twelve to twenty-four hours. In others it follows upon a period of afebrile intestinal disturbance. There are usually constitutional symptoms, and more marked prostration than in the cases having diarrhea of equal severity, but without fever. The fever may be moderate, and of short duration, and the child make a very rapid recovery under treatment, or there may be high fever, marked prostration, and a rapidly fatal ending. Colic is often present. Vomiting is usually present, but may be absent. It is often notably severe during the period of onset. Loss of weight is usually rapid. Abdominal tenderness is sometimes present, and rarely, tenesmus. The diarrhea varies in severity, the variations bearing no definite relation to the severity of the case. The movements are usually green, often contain curds, usually contain mucus, often blood. Sometimes they consist only of mucus, or of mucus and blood, without fecal matter. Early ileocolitis is more characteristic of the severer infections, but the most severe and fatal toxemia may develop without blood appearing in the stools.

Illustrative cases of the infectious type are the following:—

Mild Case.—H. S., sixteen months old. Weaned. One week ago suddenly became feverish, and vomited a number of times. Then diarrhea began. Has averaged five movements in twenty-four hours. Stools green and yellow, with curds, and much mucus. Has lost weight. No colic noted. Fever has persisted. On physical examination, child seemed apathetic, otherwise nothing abnormal was noted. Temperature 100°F.

Subsequent History.—Fever persisted for two days. Diarrhea improved at once. In four days child seemed well. Was having two yellow stools a day, normal, except that they still contained considerable mucus.

Mild Case.—W. W., twenty-three months old. Weaned. Four days ago began to have diarrhea. Was feverish, and vomited, and would not eat. Averaged thirty movements a day. Stools at first green, with mucus, and curds, streaked with blood; now consist wholly of mucus and streaks of blood. Has had colic. Now vomits rarely. Has lost weight. Fever has persisted. On examination, nothing abnormal was noted, except slight abdominal tenderness. Child does not look very sick. Temperature 99.8° F. Fever disappeared in one day. Blood disappeared in two days. In five days stools were normal, except for the presence of mucus.

Average Case.—H. G., seven months old. Fed on a pasteurized home modification, and given no water, nor anything besides the milk. Three days ago became very feverish, and seemed very sick. Began to have diarrhea, averaging fifteen movements in twenty-four hours. Stools green, no curds, much mucus, and specks of blood. No colic nor vomiting. Mother does not know about loss of weight. On examination, child looks very sick and apathetic. Pulse and respiration accelerated. Temperature 103° F.

Subsequent History.—Fever persisted for two weeks, the temperature falling gradually. Diarrhea, with much mucus in the stools, persisted for four weeks. Blood disappeared in six days.

Secondary Case of Average Severity.—L. P., five months old. Seen September 8, 1904. Fed on pasteurized home modification. Three days ago began to have diarrhea, four movements a day, yellow, loose, normal odor, many large curds, no mucus. Has not been feverish, nor had colic, nor vomiting. Has not lost weight. Examination showed nothing abnormal. Temperature normal.

Diagnosis.—Mild acute intestinal indigestion, irritative type.

September 9th.—During the night became very much worse. Became feverish, and vomited all night. Passed six loose movements. Stool shown was yellow, with curds, but contained some mucus. On examination, child seemed much weaker, and more apathetic than on the previous day. Temperature 103° F.

September 12th.—Still very sick and feverish. Very weak. Diarrhea better. Stool chiefly mucus. Temperature 101° F.

September 15th.—Somewhat better. Diarrhea "all better." Stool shown yellow, still contains much mucus. Temperature 100° F.

September 18th.—All better. Considerable mucus in stools. Temperature normal.

Severe Case without Blood.—A. S., six months old. Fed on diluted cow's milk, not heated. One week ago became very feverish at night, and vomited. The next morning began to have diarrhea, six movements in twenty-four hours. Stool shown, green, bad odor, no curds, very much mucus, no blood. Mother has never noticed blood. No colic. Child has felt very hot, and vomited a great deal during the week. Has seemed much weaker in the last few days. No vomiting since yesterday. "This morning the fever left him." On examination, the child was unconscious. Much emaciated. Extremities cold. Eyes sunken. Fontanel depressed. Radial pulse imperceptible. Heart sounds weak and rapid. Rectal temperature 104.8°F. Died four hours later.

Typical Severe Case.—R. S., six months old. Fed on pasteurized home modification. Two days ago, suddenly began to have severe diarrhea, and grew very feverish. Averaged thirty small movements in twenty-four hours. At first green, with curds, mucus, and streaks of blood, now entirely mucus with much blood. Vomited a little. Has had colic. Tenesmus. On examination, child very drowsy and apathetic. Irritable when disturbed. Some tenderness of abdomen. While under examination, three times passed a little blood and mucus. No signs of intussusception found. Did not return.

THE NERVOUS TYPE.—This type forms the smallest proportion of the cases studied. The diagnosis is based upon the absence of fever, and of signs of intestinal indigestion and fermentation. The onset was sudden in all cases in which satisfactory answers were obtained. Blood and mucus are never observed in the stools. Loss of weight is slight. Colic and vomiting may or may not be present. Very rapid recovery is the rule. No case was observed in which recovery did not occur.

Illustrative Case.—M. F., four months old. Breast-fed. Two days ago began to have loose movements. Has averaged about seven movements in twenty-four hours. Stools loose, yellow, normal odor, no mucus, no curds, no blood. Vomited once. No loss of weight. Examination negative. Temperature normal. Returned two days later. Mother said the diarrhea had ceased at once, and that the child is now perfectly well.

THE INDIGESTION TYPE.—This type constitutes the greater

proportion of the cases studied. The onset is usually sudden, but may be gradual. There may be brief initial fever. Colic and vomiting may or may not be present. Loss of weight is the rule. In the irritative group curds in the movements, and in the fermental group a notably foul or sour odor, and green color, are characteristic. The stools usually contain some mucus, but may not. The prognosis lies midway between the nervous and infectious types, being dependent upon the strength and general nutrition of the patient, and the length of time the disease has existed before coming under observation. Most of the cases in which recovery was slow, or in which no improvement occurred, were in emaciated babies, who were brought to the hospital after a prolonged course of diarrhea, and much loss of weight and strength.

As to the appearance of blood in the movements which occurred in 12 per cent. of the cases of this type, it would seem from my figures that it is evidence of the length of time the disease has existed, rather than the severity of the symptoms. Most of the cases of this type, in which blood was seen, had been ill for over one week, as will be seen from the following table:—

DURATION OF ILLNESS BEFORE THE APPEARANCE OF BLOOD.

Under 24 hours	0%
1 - 2 days	4%
3 - 6 "	21%
1 - 2 weeks	25%
2 - 3 "	17%
Over 3 "	33%

In 75 per cent. the diarrhea had existed for over one week. In the remaining 25 per cent. the cases were mainly of the irritative group, with unusually severe diarrhea from the beginning.

The following are illustrative cases of this type:—

Irritative. Average Severity.—R. G., eleven months old. Fed on diluted cow's milk. Four days ago began to have diarrhea. Averaged ten movements in twenty-four hours. Stools yellow at first, now yellow and green, with mucus and many large curds; no blood. Normal odor. Vomiting at times during last two days. Colic at times. Mother has not noticed loss of weight. On examination, child seemed bright and nothing abnormal was found. Temperature normal.

Subsequent History.—In two days, diarrhea ceased. Stools yellow, and of normal consistency with a few curds. No mucus.

Fermental. Average Severity.—J. R., seven months old. Breast-fed. Ten days ago began to vomit, and have diarrhea. Averaged twelve movements in twenty-four hours. Stools yellow at first, then bright green and frothy. Very foul odor. Considerable mucus. No curds. No blood. Was very feverish the first night, but has not been feverish since. No colic. Some vomiting. Has lost weight. On examination, child appears somewhat poorly nourished, but otherwise bright and well. Temperature normal.

Subsequent History.—In two days, mother reports diarrhea better, but stools are still green; four movements in last twenty-four hours; odor sour, but not foul. Two days later, diarrhea was gone. Since yesterday, child has had two slightly green movements, with a very little mucus.

Severe Case.—M. B., four months old. Mellin's Food. Four weeks ago began to vomit and have diarrhea. At first fifteen to twenty movements in twenty-four hours. Stools green, with foul odor, curds, mucus, but no blood. For the last three days, movements have been fewer in number, green, with very foul odor, curds, much mucus, and specks of blood. Mother never noticed fever. No colic. Less vomiting in last week. Child has lost weight very rapidly for four weeks. In the last week, child has grown very much weaker, and now mother thinks it is dying. On examination, child was found much emaciated. Eyes sunken and glassy, heart sounds weak and rapid. Temperature 95.8°F.

The patient reacted slightly to stimulation, and the diarrhea improved under treatment, which included irrigation of the colon. But the improvement in the general condition was only temporary, the patient dying two days later.

THE UNCLASSIFIED CASES.—In the majority of the unclassified cases, a definite diagnosis could not be made on account of a failure to obtain satisfactory specimens of the dejecta. Probably most of them were of the indigestion type. Six of them were cases of chronic intestinal indigestion of several months' duration, and, therefore, not to be considered as cases of summer diarrhea. One was considered a case of heat exhaustion, and one a case of cholera infantum.

CHOLERA INFANTUM.—The classical description of cholera infantum is very well known. I believe the disease is a very rare

one, here in Boston at least. Only one case in my series bore any resemblance to the description.

R. C., six months old. Fed on condensed milk. Five days ago was attacked with diarrhea, colic and vomiting. Movements very frequent, brown and watery. For the last two days child has been much worse. Has lain quiet, with occasional spasms. Movements have been just like clear water. On examination, child was seen to be in collapse. Eyes sunken. Fontanel much depressed. Extremities cold. Heart sounds very weak. Rectal temperature 104.6°F. While under observation, patient had a movement consisting of clear serous fluid, with slight brownish color. Sent to Floating Hospital, but was never heard from.

Heat Exhaustion.—T. H., eight weeks old. Breast-fed. Was perfectly well yesterday, but this morning, after a very hot night, would not rouse up nor take the breast, and mother noticed he felt very hot. Has passed three loose yellow stools. No other symptoms. On examination, the child was unconscious. Skin hot and dry. Heart sounds rapid, and of good quality. Temperature 105.8°F. The child was given a cold pack, and the mother was told to sponge the child with water at a temperature of 90°F. for fifteen minutes every hour. Rapid recovery ensued, without gastroenteric symptoms.

A certain resemblance may be noted between this case, and the case of diarrhea of the acute nervous type, this case differing only from nervous cases with brief initial fever, in its much greater severity.

CONSIDERATIONS AS TO ETIOLOGY.

Two questions present themselves as a result of the description and purely clinical classification of this series of cases:—(1) Does it throw any light on the question of etiology, apart from bacteriologic etiology? (2) What are the evidences pointing toward a bacteriologic etiology?

The cases show no essential differences from the clinical pictures presented in cases occurring during the winter months. Cases of intestinal indigestion, febrile cases, and cases of disturbance from nervous influences occur at all times of year, and their occurrence has been universally recognized. Not one case in the series, except the heat exhaustion, and possibly the case of presumable cholera infantum, show any peculiarities which justify the setting apart of summer diarrhea as a special type of

intestinal disturbance. The one notable feature is the enormously greater prevalence of these cases during the hot months. What is the cause of this increased prevalence?

Many authorities, especially those inclined at all times to emphasize the rôle of microorganisms in producing disease, have maintained that the cause is primarily food contamination; that foods, especially milk, being at all times a favorable culture medium for bacteria, are in hot weather made especially favorable through the prevalence of a temperature conducive to bacterial development. They attribute to bacterial infection from without through contaminated food, the chief rôle in producing these disorders.

The milk supply being the same in summer as in winter, such increased opportunity for bacterial growth must occur, either before or after the milk is brought to the house of the patient. At the depots from which the milk is delivered, it is kept upon ice. After the milk enters the house of the patient, the conditions are not so widely different in summer as might be expected. I visited during the past summer the homes of a number of hospital patients, and invariably found the baby's milk properly kept in an ice-chest, and I believe that the vast majority of the people who attend the clinic keep their milk in this way. This reduces the opportunity for favorable conditions for bacterial growth in summer to the period of transmission between the cow and the milk depot, comparatively brief. We must obviously grant that an increased opportunity for bacterial development is more likely to occur during the hot months, but this does not by any means prove that food contamination is the cause of summer diarrhea.

One of the above statistical tables, that on previous feeding, shows that the previous feeding was presumably sterile in 183 cases of diarrhea. Leaving out the 244 cases having a variety of food, the remaining cases, which were fed on milk or patent foods presumably not sterile, amounted to 190, very little more. Figures of still greater interest are obtained by considering the occurrence of diarrhea in cases under two years, which were being regularly treated at the hospital for other things. Diarrhea developed at some time during the summer in 59 per cent. of all cases fed on foods presumably not sterile, and in 55 per cent. of the cases fed on foods presumably sterile. From these facts it would seem to be a reasonable conclusion that bacterial infection from without,

through increased opportunity for food contamination, is not the chief cause of summer diarrhea, as observed at the Out-Patient Department of the Infants' Hospital.

The cause must lie in the increased heat of the weather. If this is not operative in producing milk contamination, it must act in some other way. The large majority of the summer cases resemble the intestinal indigestion of the colder months. In summer the only different condition is the heat, and, therefore, we must conclude that the heat itself is the main cause of the greater frequency of intestinal indigestion in July, August and September.

Exactly how the heat acts is a theoretical question which I shall not go into at length. The various theories which different observers have advanced are not easily susceptible of proof. The most plausible is that the increased heat, either through disturbance of the nervous, or circulatory system, or of both, diminishes the secretion of the digestive fluids. Curds are, therefore, not properly digested and broken up; hence the cases of irritative indigestion. The secretion of fluids known to be antiseptic, or at least to inhibit bacterial development is diminished, allowing opportunity for increased development of bacteria present at all times in the intestine; hence the fermental cases. The action of heat in producing the nervous cases has long been recognized. The action of heat on the nervous system, causing an overheating of the child, would explain the brief initial fever observed at times in all the noninfectious types.

The majority of my cases being of the indigestion type, and not bearing clinically the usual evidences of true infection, I see no reason for seeking any cause beyond heat, and its consequent indigestion, as necessary to explain their greater frequency during the summer months.

But how shall we reconcile this conclusion with the Report of the Rockefeller Institute, where a definite pathogenic organism, the bacillus dysenteriae, was isolated from such a very large percentage of cases of summer diarrhea? It would be interesting in this connection, in the first place, to see how many of the Rockefeller cases would, under the above suggested classification, be considered as clinically of the indigestion type. Unfortunately, this is not wholly possible. A certain number of the reported cases were not described in such a way as to meet my particular requirements. More attention was paid in the clinical descrip-

tions to the character of the stools, than to the existence and persistence of fever. In a certain number of cases, the temperature was recorded as being not over 100.5°F. All such cases I have been obliged to designate as doubtful. The results follow:—

CLINICAL CLASSIFICATION OF THE ROCKEFELLER CASES.

Infectious	137 cases
Noninfectious	22 “
Doubtful	78 “

These are very different figures from my series. Most of the cases where the clinical histories were given in full, were typical examples of what I term the infectious type of intestinal disease.

The majority of their cases were of the infectious type, of mine of the noninfectious. This can only be explained by the fact that not all the observers examined consecutive cases, and by supposing that the relative frequency of the infectious, as compared with the noninfectious cases, differs in different institutions and in different localities. Hastings reports 28 cases in which the bacillus dysenteriae was found, out of 31 cases examined in the Boston Floating Hospital. Of these 28 positive cases, 25 would be classified clinically as of the infectious type. But as he states that all cases examined were taken from the permanent wards of the hospital, which receive only the severer cases, and that there was no examination of consecutive cases, his figures do not afford a basis for conclusion as to the relative frequency of infectious cases in Boston.

Undoubtedly, from the figures in the Rockefeller Report, we may conclude that the bacillus dysenteriae may be isolated from cases of the noninfectious type. We cannot learn whether, in those particular cases, there was additional evidence of true infection, namely, a positive agglutination reaction. If not, is it not possible to explain the findings of the organism in many summer cases of intestinal indigestion without admitting that true infection is necessarily present? According to the conclusions of Flexner, the bacillus dysenteriae may be present as a saprophyte in the intestine, together with many other organisms. And, according to the theory of etiology of the frequent summer cases advanced above, the diminished digestive secretions afford a ground for increased development in the intestine of all varieties

of microorganisms. Is it not possible, that through this unusual development of various varieties, the relative ease with which any particular organism, among others the bacillus dysenteriae, can be found, may be greatly increased? It has been found with great difficulty in normal children. If it is found with greater ease in the summer cases, its presence in these cases would be explained without the necessity of concluding that it infects the patient in the strict sense of the word. The very fact that the majority of cases in which it was found by the Rockefeller investigators were clinically infectious cases, is an argument against it being the cause of the noninfectious cases, which formed the majority of those observed at the Infants' Hospital.

As to the infectious cases, it seems probable that bacteria do play an important part in their etiology. Nevertheless, the heat is probably the underlying cause, for the same argument as to the heat as a cause of their increased prevalence in summer applies here. We have seen how the heat produces indigestion, and its consequent diarrhea. In such a condition, with irritation of the intestinal mucosa, its vulnerability would be increased, its resistance to true infection diminished, and there is increased bacterial growth in the intestine. When the multiplying pathogenic organisms attack the less vulnerable tissues, true infection occurs and we have clinically an infectious type of case.

Heat, then, being the primary cause of the great outbreak of diarrheal disease in the summer months, the name thermic diarrhea would cover the entire group. The theory of the occurrence of infection outlined above, is merely suggested as a possible, or perhaps even probable, explanation, to be confirmed or rejected by future investigation. Other questions which remain to be settled in the future, are the following:—

(1) Is our conclusion that the type of case, clinically non-infectious, is not due to true bacterial infection, justified?

(2) Are the clinically infectious cases always true infections, or can absorption of toxins give a positive agglutination reaction, and the clinical picture of infection, without true infection of the tissues occurring?

(3) Is the bacillus dysenteriae the only cause or the chief cause of cases of true infection, or toxemia?

(4) What, if any, are the other organisms which can cause a true infection?

COMPARISON OF CLINICAL TYPES WITH LABORATORY FINDINGS IN
81 CASES OF THERMIC DIARRHEA.

During the summer of 1903 and 1904, I made upon Infants' Hospital cases as many bacteriologic and blood examinations as time afforded, using no selection, but taking cases at random. I used, during the first summer, the technique recommended by Duval and Bassett in their report on the investigation of 1902. Negative results obtained in this summer are, however, of no value, as I did not carry the investigations far enough. Not enough plates, nor colonies were examined to enable me to say that the bacillus dysenteriae was not present. Sixty-one cases were investigated in this summer. In 1904 I used the technique recommended by Duval in his report of the investigation of 1903, and I had the great advantage of working in the same laboratory with Dr. Duval, and Dr. Paul A. Lewis, to whose advice I am greatly indebted. Twenty cases were examined, during this summer, and negative results were reported only after a search through at least twelve plates. In every case agglutination tests were made. Whenever a patient, whose stool was under investigation, did not return for at least a second blood examination, the investigation of that case was either discontinued, or it was not included in the total. The agglutination tests were made always with the organism isolated from the patient whose blood was tested. The reaction was counted as positive in a dilution of 1:100 or higher. Time, one hour. All the positive cases, except 1, reacted in 1:200 dilution or higher.

During the first summer the reaction of the organisms isolated toward mannite media was not tried, the proof that they were the bacillus dysenteriae resting upon the characteristic reactions toward other media, notably litmus milk, and on the fact that they were in all cases agglutinated in high dilution, usually as high as 1:5000 by the "Harris" antidysenteric serum. They were also agglutinated by the "Shiga" serum, but in much lower dilution. They were, therefore, presumably of the mannite fermenting group. The organisms isolated from 5 cases in the second summer all fermented mannite.

The results are of no value as showing the per cent. of cases where the stools contained the organism, as compared with the percentages obtained by other observers, owing to the deficient technique of the first summer. Their interest lies in the compari-

son between bacteriologic finding, agglutination, and clinical type of disease.

Number of cases.	Bacillus Dysenteriae.	Agglutination Reaction.	Clinical Type.
58	0	0	Indigestion
14	+	+	Infectious
6	+	0	Indigestion
2	0	+	Infectious
1	0	0	Infectious

These results strongly support the view that the finding of the organism with a positive agglutination reaction occurs usually in a type of diarrheal disease which I have designated as clinically infectious. There were 14 of this kind, of which 10 were moderate or severe, and 4 mild, the mild cases having a temperature under 100.5°F. Eight of them showed blood in the stools, and 6 were fed on food "presumably sterile."

The finding of the bacillus in 6 cases of the indigestion type supports the view that the organism may be found without a true infection, as it is notable that in no one of these 6 cases was a positive agglutination reaction obtained. It is probable that the number of cases in this class would have been larger, if my technique in 1903 had been as thorough as in 1904.

In the 2 cases of the infectious type, where the agglutination reaction was positive, the negative bacteriologic finding can be attributed to deficient technique, both these cases having occurred in the first summer. The successful isolation of the organism in the first summer in 15 out of the 20 positive cases, in spite of deficient technique, can only be explained by the fact that the general type of diarrhea occurring in 1903 was clinically more severe, and infectious cases more common, than in 1904.

The last case, of the infectious type, but with negative bacillus dysenteriae finding and negative agglutination test, is an interesting one. It was clinically a mild case, with no special characteristics. The plates showed a great preponderance of colonies of the bacillus pyocyaneus, which were in almost pure culture. Such a finding did not occur in any of the cases of the Rockefeller Report. It is interesting as bearing on the question of whether the bacillus dysenteriae is the sole cause of infectious diarrhea.

INFANTILE DYSENTERY.—The term infantile dysentery, sug-

gested by Holt, would seem exceedingly appropriate to those cases of diarrheal disease, of which the bacillus dysenteriae is the cause. To use it with the strictest accuracy, we must prove the connection of this specific organism with the case as far as is in our power, that is, both by finding it in the discharges, and by finding a specific agglutinin in the blood of the patient. From the researches made up to the present time, it is obvious that whatever may be the final outcome of future bacteriologic research, the bacillus dysenteriae is the chief, if not the sole, cause of the majority of infectious cases. Given, therefore, a case, to be classified clinically as infectious, with persistent fever, especially if early evidences of ileocolitis, or mucus and blood, appear in the discharges, we may diagnose it as presumably a case of infantile dysentery, until further researches have failed to establish the connection of the particular case with the specific organism; or in those cases where further research is not practicable.

SUMMARY OF CONCLUSIONS.

(1) The diarrheal diseases of infancy occurring in the summer months differ in no way, either clinically or anatomically, from the diarrheal diseases occurring in the cooler months, except in their much greater frequency.

(2) Classification on an anatomical basis, as, for example, into functional and organic, or noninflammatory and ileocolitis, is not convenient for etiologic study, owing to the variety of lesions found in cases of similar etiology and similar clinical course, and to the lack of correspondence between anatomical and clinical picture.

(3) The following clinical classification is suggested:—

(a) Acute Nervous Diarrhea, characterized by loose stools of normal color and odor, without abnormal constituents.

(b) Irritative Diarrhea. Acute intestinal indigestion of the irritative type, characterized by the absence of persistent fever, and by the presence of curds and undigested masses in the discharges.

(c) Fermental Diarrhea. Acute intestinal indigestion of the fermental type, characterized by the absence of fever, and by green stools of a foul or sour odor.

(d) Infectious Diarrhea, characterized by the existence and persistence of fever, and by the tendency toward early signs of ileocolitis, as shown by the presence of blood, and excess of

mucus in the discharges. When a specific organism, the bacillus dysenteriae, is proved to be the cause, the case may be further particularized by the term infantile dysentery.

(e) Rare cases occur, corresponding to the known description of heat exhaustion, and cholera infantum.

(4) Of the above differentiated types, the indigestion, including the irritative and fermental cases, is by far the commonest.

(5) The chief or primary cause of all the above types is the increased heat of the weather occurring during the summer months, which probably acts in the noninfectious cases by producing functional disturbance either of the nervous system or of the digestion; and which acts in the infectious cases by producing in the intestine conditions more favorable to the occurrence of infection. The name Thermic Diarrhea can be given to the entire group.

(6) Bacteria are the secondary cause of a certain number of cases, such cases being mainly, if not wholly, of the type classified clinically as infectious.

(7) Infection occurs by the introduction of bacteria from without, or by autoinfection with bacteria already in the intestine. The latter is probably the usual method.

(8) The bacillus dysenteriae is a cause of most of the infectious cases. Whether it is the sole cause remains to be determined.

(9) The bacillus dysenteriae can often be found in the intestine in cases where it probably has no casual relation with the pathologic process. Such cases are usually clinically of the non-infectious type.

(10) Other organisms are probably a cause of some infectious cases.

(11) The anatomical changes of various kinds included under the term ilocolitis may occur in any of the above clinical types, except the acute nervous. Anatomical changes of some kind probably occur in all infectious cases.

The above attempt at clinical classification is probably only temporary, and is advanced in the hope of making somewhat easier the work which will be done in the future as finally settling the remaining questions on this subject.

THE FAT QUESTION IN ITS RELATION TO THE PRODUCTION AND CURE OF INFANTILE MARASMUS.*

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It is, of course, well understood that infantile marasmus, like any other condition of underassimilation, is not the consequence of the self-same primary cause in every instance. As a matter of fact, however, food physically, chemically or biologically unsuited to the needs of the delicate infantile organism is the most frequent instigator of the gastrointestinal disturbances, which again are the usual forerunners of athrepsia infantum.

In breast-fed infants, pronounced marasmic conditions are of comparatively infrequent occurrence; in the overwhelming majority of instances, wasting and atrophy supervene in bottle-fed, that is, in artificially nourished, children. Milk modifications and substitutes, purporting to replace the physiologic nutriment, are numerous; some are fairly rational, but a majority ad nauseam to the earnest seeker of truth and still more so to the helpless babe, have sprung into the field in the last fifteen years.

Frequently, no doubt, the onset of athrepsia infantum has been averted by one of the more rational milk modifications or substitutes; but this peculiar state of undernutrition is met with by the clinician of to-day in at least the same proportional numbers as was seen by his predecessor twenty and thirty years ago. Furthermore, when infantile atrophy has once ensued, none of all the milk modifications or food preparations so far devised, and for that matter not even good breast milk, seems to possess any special virtues in checking the wasting.

I have no intention whatsoever to thresh over old straw, and I am loath to sit in judgment on the multitude of formulas for the attenuation and modification of cow's milk or the various methods of artificial infant feeding. However, I wish to dwell on a much neglected point in infant feeding, a factor which may be at the foundation of many an instance of athrepsia infantum. This factor is the *chemical* character of the fatty substances contained in the baby's nutriment.

While the quantity of the fat aliment has found frequent prac-

* Read before the Section on Pediatrics of the New York Academy of Medicine, April 12, 1905.

tical consideration (Biedert's Cream Mixture, Gärtner's Fat Milk, etc.), its quality—apart from various minor attempts at modifying the fat of cow's milk which, physically and chemically, differs widely from that of mother's milk—has hardly ever been taken into account when devising a food for the healthy and particularly for the diseased and undernourished infant.

The fat of mother's milk, of course, is and should be the physiologic fat aliment of the normal nursling; properly constituted and in amounts suitable to the needs of the individual infantile organism, it does not yield low fatty acids to the extent of calling forth intestinal or other disturbance and is absorbed and anabolized in quantities guaranteeing normal growth and development. Production and secretion of the fat substances in human milk, however, occur not always in the same ratio, and their composition may vary considerably. As long as quantity and quality of the fatty components of mother's milk fluctuate between physiologic limits, normal fat decomposition and assimilation will not be interfered with, and unless there exists some anomaly of the other milk constituents, or a bodily insufficiency or a pathologic condition, the development of the baby—although progressing but slowly at times—continues uninterruptedly as a general rule.

On the other hand, if for protracted periods the fat substances of mother's milk occur in distinctly abnormal amounts, or in a less perfect emulsion, or if they are perverse in admixture or composition, gastrointestinal disturbances, accompanied by severe metabolic irregularities or by toxic phenomena and terminating in bodily decline and atrophy, will supervene sooner or later. If permitted to run for any length of time, this wasting condition cannot always be checked and a fatal termination be averted, in instances even where the fatty principles of the mother's milk have meanwhile been excreted in normal amounts and composition, or in which the child has been fed on the milk of another woman.

Happily, extreme alterations in the amount and especially in the composition of the fat of the milk of a healthy woman do not ensue very often, and therefore a pronounced marasmic condition obtains comparatively rarely in the (at birth normal) breast-fed child.

In artificial nutrition, no matter whether a modification of cow's milk or a food preparation is utilized, the entire fatty principles are, as a rule, derived from the cream of cow's milk.

The fat of cow's milk, it is true, may be added to the food mixture in any desired amount; its composition, however, is liable to vary to a far greater extent than that of the fat of human milk, it being dependent on the breed and race of the animal, its individual characteristics, its age, how often it has calved, the time of lactation, the hour of milking, the season, quantity and quality of food, etc. Besides, and this is a fact but insufficiently expounded, the composition of the fat of cow's milk is at variance with that of the fat of human milk, differing especially in its far greater contents of volatile fatty acids, among which butyric acid is the most important. In the following table the discrepancies in the constitutions and proportion of the fats of mother's and cow's milk are quickly recognized:

PHYSICAL CHARACTERS.

Fat of Mother's Milk.	Fat of Cow's Milk.
Specific gravity at 15°C. 0.966	0.949 - 0.946
Melting point 30 - 34°C.	31.1 - 34.66°C.
Solidifying point 19 - 22.5°C.	35 - 38°C.

CHARACTER AND PROPORTION OF FATTY ACIDS.

Acid butyric, $C_4H_8O_2$	1.4	5.45	8.35
" caproic, $C_6H_{12}O_2$		2.09	
" caprylic, $C_8H_{16}O_2$		0.49	
" capric, $C_{10}H_{20}O_2$		0.32	
" lauric, $C_{12}H_{24}O_2$	49.2	2.57	53.90
" myristic, $C_{14}H_{28}O_2$		9.89	
" palmitic, $C_{16}H_{32}O_2$		38.61	
" stearic, $C_{18}H_{36}O_2$		1.83	
" dioxystearic, $C_{18}H_{36}O_4$		1.04	
" oleic, $C_{18}H_{34}O_2$	49.4	32.5	

Very small amount of volatile fatty acids; oleic acid forms one-half of the non-volatile acids; of the solid fats, myristic and palmitic acids occur in larger amounts than stearic acid.

Volatile acids according to other analyses about 10 per cent.; among the solid acids palmitic and stearic acids preponderate.

If we remember that mother's milk usually exhibits a somewhat larger percentage of fat substances than cow's milk—on the

average 3.85 per cent. in the former and 3 per cent. in the latter—and that in order to compensate for the apparent deficiency, hand-fed children frequently obtain the fatty elements of cow's milk in larger proportion than they exist in the native product, we understand, that the absolute discrepancy of the fat as it is given to the infant is even greater than its relative discrepancy as pointed out in the table. An extra amount of fat of cow's milk added to the child's food enhances the latter's contents of volatile fatty acids. Thus, in practice, the discrepancy in the proportion of the fatty substances may even become a greater one.*

It is evident that a fat-compound consisting of 10 per cent. of volatile acids cannot be a rational substitute for a fatty nutrient into the composition of which these volatile acids enter in but comparatively small amounts. The most important of these volatile fatty acids is butyric acid, whose very presence in the fat of human milk has been denied by some investigators.

At any rate, the proportion in which it normally occurs in the fat of mother's milk is so small that any untoward action on its part has to be precluded. When it is exhibited in proportionally larger amounts for any length of time—a rare but always pathologic event—the human milk in which it is contained sooner or later ceases to contribute to the welfare of the nursing.

Inasmuch as the fat of cow's milk always displays a large quantity of butyric acid, and as this is the mother substance of the acetone bodies, the former would *a priori* not represent the ideal type of fatty nutriment for the infant. Besides this, the infantile organism is not particularly well adapted for the fat compound derived from cow's milk; it being unable to cope successfully with it even in a mere physical sense. This is evinced by the smaller absorption of the fat of cow's milk. Uffelmann (*Archiv. f. Kinderhk.*, Vol II., 1881) determined that the absolute amount of fecal fat after the use of mother's milk was normally about half that when cow's milk had been the nutriment (in the dried feces 0.8-0.9 gram fat per diem after cow's milk, 0.44 gram after mother's milk). A larger excretion of fat of cow's milk than of that of human milk, although not in as a pro-

* It must also not be lost sight of that in human milk the fat is in a much finer state of emulsification than in cow's milk, which facilitates its direct absorption. This is of great importance, as there are in the infantile organism but insufficient amounts of biliary acids and pancreatic development and function are as yet not far progressed.

nounced a disproportion as in the normal state, occurs also in pathologic conditions of the digestive tract.

The occurrence in the feces of absolutely and relatively larger amounts of fat of cow's milk is *prima facie* evidence of its more incomplete utilization by the youthful organism. As a matter of fact, however, the fat of mother's milk is also incompletely absorbed, the fat contents of dry feces when mother's milk is the habitual food fluctuating between 10 and 20 per cent. The younger the infant the larger the amount of non-absorbed fat. The dried feces of infants during the first week of life, according to Blaurog (Die Fæces, Schmidt und Strasburger, 1903), contain 40 per cent. of fat when mother's milk, and fully 50 per cent. when cow's milk has been ingested. The fecal fat, surplus fat, as it has been called by some, which is found, though in widely varying quantities, in all conditions possibly has to fulfil a certain mission. Maybe it is essential for a better evacuation of the infants' bowels, maybe it acts as a protector of the intestinal mucosa, maybe its purpose is a different one altogether. This much we may put down as an irrefutable fact: The more the fat output by the feces approaches the minimum figure for each period of infant life—provided normal amounts of food exhibiting a proper ratio of fats have been ingested—the better the gastrointestinal organs perform their work, the healthier the youthful organism, the brighter the outlook for its normal development.

However, I wish to dwell on the character and not on the amount of the fatty substances. The volatile, soluble fatty acids, those which are more or less soluble in hot water whereby their molecular weight diminishes and which include those members of the fatty acid series up to capric acid, occur, as we have seen in unusually large amounts in the fat of cow's milk. Butyric, caproic, caprylic and capric acids are contained in the fat of cow's milk in from six to eight times the quantity in which they are present in that of human milk. As the physical and chemical properties of the milk-fat are dependent upon the absolute and relative amount of lower and higher and uncombined fatty acids, it is evident that such a vast discrepancy as that existing between the constitution of cow's milk-fat and mother's milk-fat, cannot be overcome by any possible modification of the former.

Milk fat, chemically speaking, is a compound of mixed glycerin esters and not a simple mixture of triglycerides. Ac-

According to Volhard (*Zeitschrift für klin. Med.*, Vol. XLII.), a certain degree of decomposition of the neutral milk fat into glycerin and fatty acid occurs already in the stomach. The neutral fats very likely undergo hydrolytic decomposition and are rendered soluble partly by saponification and partly (as fatty acids) by the action of the bile. In as far as almost the entire fat contained in the thoracic duct occurs as neutral fat in the form of a fine emulsion, while acids and soaps are present in minute quantities only, we are forced to conclude that a reconversion into neutral fats must take place in the intestinal wall. The fat in the intestinal tract of the ingested volatile fatty acids is probably similar to that of oleic acid and the higher members of the fatty acid series. Nothing definite, however, is known in this respect. The volatile fatty acids appearing in the feces do not offer any information in this regard, as they are practically always the result of carbohydrate fermentation in the intestines; likewise, no adequate explanation is afforded by the urinary volatile fatty acids, as oxybutyric acid and its concomitants and derivatives which, in the opinion of some of the more recent investigators, are products of an incomplete oxidation of the fatty acids of higher molecular weight. That this is not always the case, even not when these acids appear in pathologic amounts, I think I have conclusively shown by the dieto-therapeutic test elsewhere ("Concerning the Suppression of Acetone Bodies in Diabetics." *American Medicine*, December, 1904).

It would lead me too far were I to take up on this occasion the acetone question and all it implies. It is enough to state that acetone of supposedly intestinal formation has not infrequently been accused of being the promoter of periodical vomiting in children, of infantile eclampsia and of numerous other affections to which the young child is prone. Be this as it may, of one fact we may be certain, that butyric acid in quantities sufficient to furnish large amounts of acetone substances cannot have been yielded by carbohydrates or proteids, but must have been ingested as such. What is nearer than to assume that the fat of cow's milk, which contains abundant butyric acid, is the real instigator of a number of pathologic affections which with little justification have been ascribed to an autotoxic origin.

Turning from the acetone question which, in its relation to various infantile disturbances, offers a field of fertile discussion, and even more of vast speculation, we find that the volatile fatty

acids as furnished by the fat of cow's milk are very decided irritants of the delicate intestinal mucosa of the infant. The ingestion of these acids is therefore the primary cause of many instances of gastrointestinal irritation and disease followed by under-nutrition, bodily retrogression and athrepsia infantum.

Gastrointestinal irritation once set up, progresses rapidly when the nutriment is not changed, that is, in those instances, when the supply of fat is not materially altered. The alteration in the fat supply as exercised to-day being almost without exception a quantitative one, consisting of reduction, suspension and even increased supply of fat aliment—it is obvious that an improvement in the little patient's local and general condition, when the fatty constituents of the nourishment are at the foundation of the disturbance, is always more or less a matter of luck.

No doubt the proteids and carbohydrates of cow's milk or artificial food-stuffs quantitatively and to a greater degree qualitatively, also stand frequently at the bottom of the gastrointestinal disturbance, which, in course, gives occasion to the development of infantile atrophy.* Their eventual unsuitability, however, is a matter of general information, while the inadequacy of the fat of cow's milk in the feeding of babes is known to comparatively few clinicians. It is true, they often withhold the milk totally in certain affections of the gastrointestinal tract, to which fact the speedy recovery of the infant is undoubtedly to be ascribed, yet they are not aware that, in the given instance, neither proteids nor carbohydrates, nor eventual superabundance of bacteria, but the fatty constituents of the milk furnished the source of the pathologic condition or prevented its amelioration.

While withdrawal of milk-fat in hand-fed infants may frequently result in cessation of the local disturbance, it is obvious that the infant cannot exist for any length of time without fatty ingesta of some kind. Again, the incipient marasmic condition, or that already established, cannot be relieved unless a sufficient amount of assimilable fats, yielding but insignificant amounts of volatile fatty acids, is added to the nutriment. Vegetable oils and those animal fats exhibiting a high melting point being out of question, there is nothing left us but to resort to the fats furnished

* It is not improbable that the greater amount of citric acid and inorganic salts contained in cow's milk exert an unfavorable influence upon the digestive tract, the osmotic conditions and the nutrition of the infantile organism.

by the yolk of the hen's egg. Yolk-fat, indeed, is the ideal fat for infants suffering from chronic gastrointestinal disturbances, together with latent or even pronounced athrepsia infantum.

It would lead me too far to dwell again on the peculiar adaptability of the yolk of the hen's egg in the treatment of various forms of malassimilation. Those interested are referred to my former communications on the subject.* On this occasion I only wish to mention some of the factors which prompted me to substitute yolks for milk-fat in the treatment of under-nourished infants afflicted with gastrointestinal disease.

I. Yolk-fat, in its native state, in suitable amounts and admixture, is well borne and well liked by the majority of infants (idiosyncrasy is rather due to the white than to the yolk of the egg).

II. The great absorbability of yolk-fat, the residue left by yolk-fat in the feces, is smaller than that of any other animal fat.

III. The fat-components of the yolk of the hen's egg, palmitin, stearin and olein, yield no, or hardly any, volatile fatty acids, and consequently give no occasion to the production of the acetone bodies.

IV. The large amount of lecithin contained in the yolk tends to the restoration of nerve force, and acting as a general reconstituent ameliorates the cachectic condition.

V. The occurrence in the yolk of a diastatic ferment assisting in the conversion of amyloid substances.

VI. The property of the yolk to stimulate the digestive secretions.

The entire egg has been frequently employed by the pediatricist, the yolk alone but rarely. There is no consensus of opinion as regards the digestibility of the whole egg in the infantile alimentary tract. Some extol the egg as an important and readily digestible nutrient in early life, while others are absolutely opposed to its utilization.

Monti, who belongs to the latter class, deems it possible that the employment of storage-eggs to a certain extent may be responsible for his personal adverse opinion. He thinks that it is always risky to give eggs to children before they are weaned, as

* "Autointoxication and its Treatment," *Medical Standard*, November, 1904. "Concerning the Suppression of the Acetone Bodies in Diabetics," *American Medicine*, December 3, 1904. "The Yolk Cure in the Treatment of the Underfed," *Medical Record*, December 31, 1904.

digestive disturbances are likely to be set up in the majority of instances.

There is no doubt that the total egg is badly borne by the average nursing. This finds its analogue in a certain proportion of healthy adults who have an "idiosyncrasy" for eggs. The individual constitutional aversion to eggs in my opinion is solely due to the white of the egg. I have never met with it when raw, fresh yolks alone were partaken of. The white of the egg, which exhibits the bulk of the latter's proteid substances, is apt to yield undue amounts of hydrogen sulphid and ammonia. This is particularly liable to occur in instances of retarded digestion of whatever causation. The yolks as I have shown leaves the stomach in a very short time and does not contain the elements giving rise to hydrogen sulphid to the degree that the latter could produce any untoward results. A mixture of yolks with water and sugar, which has been recommended as a food for the newborn, is rightfully condemned by Monti. Such a combination is in the first instance irrational in itself, and there is no reason whatsoever why it should be given as a nutriment to the normal infant when it first enters life.

It must be understood once for all that yolks should neither find employment in the newborn nor in the infant which thrives on the physiological nutriment or on a modification of cow's milk. I suggest the use of yolks only in such pathologic conditions which may lead to *athrepsia infantum*, and which are due to or aggravated by the fat constituents of the nourishment.

There are two essentials which must be followed when good shall result from the ingestion of yolks.

First—The yolk-fat must completely replace the milk-fat.

Second—The amount of yolk-fat, without being in excess, must be adequate, that is, it must conform to the caloric and nutritive demands of the organism.

The first essential is self-evident. By withholding the milk-fat from the nutriment we remove the eventual etiologic or aggravating factor of the underlying disease, or a fat-compound which, in the specific instance, has demonstrated its inadequacy in supplying the systemic demands. Substituting for it yolk-fat, we furnish to the deteriorated or diseased infantile organism a fat-combination which does not yield butyric acid or its derivatives, and which it is able to anabolize in the great majority of instances. Cod-liver oil, empirically prescribed for under-nourished children

since time immemorial, although frequently serving a good purpose, will never be considered part and parcel of the infants' nutriment, and does not bear comparison with the yolk-fat as a dietetic factor. Untoward results obtained by yolks in the treatment of the under-nourished, and more especially of athrepsia infantum, in a great measure are due to the non-withdrawal from the nourishment of the mischievous milk-fat.

The second essential—for all practical purposes—is readily executed. A marasmic infant, in spite of abundant milk-fat, may continue to decline. It is evident, therefore, that the child does not properly anabolize the fatty substances introduced by the milk-fat. When this is replaced by another fat-compound, as yolk, for instance, it is not the amount of the latter but its physico-chemical constitution and its absorbability which primarily count. A very small amount of yolk, probably a quarter of a teaspoonful each for feeding, may be all that it needed when the change is first made. No matter how little of the proper fat-compound is ingested it serves a better purpose than a superabundance of the wrong fatty material. Even if during the first two or three weeks of yolk-administration the child holds but its own, we have an indication that active decline has been checked for the time being. In every-day practice all that seems necessary when resorting to yolk-fat in the dietetic management of marasmic children is to start with aforementioned quantity and to very slowly increase it to the physiologic requirements of each individual case. The physiologic demands are satisfied when the digestive disturbance abates and the infantile organism thrives in a normal manner. These requirements, of course, are different in every instance and have to be ascertained in each individual case.

The fat-compound "yolk" differs widely from the fat-compound "cream." Again, amount and proportion of the fatty contents of the yolk are changeable as they are in the mammary secretion of the woman and the domesticated animals. Hence, the corresponding caloric and nutritive value of both fat compounds cannot be accurately calculated.

The petroleum-ether extract of the yolk, according to Jean (*Annal. de Chimie Analyt.* 8), amounts to 48.24 per cent.; the average quantity of fat in cream is about 20 per cent. An average yolk weighing about 12.5 grams, hence, contains about 6 grams of fat. The same amount of fat is exhibited in 31.25 cc. of cream. Roughly speaking, an ounce of cream would, therefore,

correspond to one yolk as regards their fatty contents, and a teaspoonful of yolk (4 grams) and 10 cc. of cream would contain about equal amounts of fat.

A 1 per cent. fat mixture is furnished approximately by 5 cc. cream, or 2 gr. yolk ($\frac{1}{2}$ teaspoon).

A 2 per cent. fat mixture is furnished approximately by 10 cc. of cream, or 4 gr. of yolk (1 teaspoon).

A 3 per cent. fat mixture is furnished approximately by 15 cc. of cream, or 6 gr. yolk ($1\frac{1}{2}$ teaspoons).

A 4 per cent. fat mixture is furnished approximately by 20 cc. of cream, or 8 gr. yolk (2 teaspoons).

The primary caloric value of the fats of both fat-compounds naturally is the same, but the absorbability of the yolk-fat as shown by me (the yolk cure in the treatment of the underfed) is greater than that of any other animal fat. As a matter of fact, therefore, yolk-fat generates more calories and is of higher nutritive value than milk-fat. Thus, it evinces that the figures heretofore given, can serve for general orientation only.

I do not offer any suggestions as to the further modification of cow's milk besides that on which I have already dwelt. There are numerous methods in vogue and every practitioner of experience knows how to obtain a certain percentage and quantity of proteids and carbohydrates. Practically speaking, I have confined myself on this occasion to the recommendation of skimmed milk* and the addition thereto of physiologic amounts of a non-deleterious native fat-compound. It is the office of the clinician to devise any further modification of the skimmed milk.†

The unaltered native yolk-fat is the one which I have made use of in my experiments. Good results can only be obtained by employing the unmanipulated raw yolk.‡ The less the yolk is

* Of course skimmed milk still contains yet about 0.2 per cent. fat. This we cannot remove without rendering the milk unfit for the use of the infant.

† Whey and junket from modified skimmed milk and proportional amounts of egg yolk suitable for marasmic infants may be readily prepared. The milk-curdling ferment, however, should be in a menstruum free from alcohol and free acid, which latter are apt to increase the underlying gastrointestinal disturbance. In response to my request for a complete extract of the gastric juice (including rennin), without alcohol and without free acid, Fairchild has supplied me with a very satisfactory product, evincing high energy both proteolytic and curdling. This product, however, cannot be procured in the market.

‡ Cooking or sterilization changes the physical conditions of all animal fats, especially of that of the milk and yolk.

agitated the easier it is of digestion, and the more it retains its fermentive and stimulative properties. It is to be added to the already prepared skim-milk modification after the latter has been warmed to about 105° F.

The electrical conductivity of skimmed milk plus physiological amounts of yolk-fat is probably somewhat greater than that of native milk. Skimmed milk exhibits a greater conductivity than the native product, the former 48.57, the latter 47.62. This is caused by the interference of the fat globules with the movement of the ions. The fat-globules of native milk outnumber those which are due to yolk-fat when added in physiological amounts to skimmed milk.

Lct us review the data which we may glean from this communication.

First.—The overwhelming majority of cases of infantile marasmus occur in artificially-nourished children.

Second.—The gastrointestinal disturbances underlying infantile atrophy are very often due to the character of the food and not infrequently to its fatty contents.

Third.—While the *quantity* of fat aliment has found frequent practical consideration, the *chemical character* of the fatty substances entering into the baby's nutriment have hardly ever been inquired into by the clinician.

Fourth.—The composition of the fat of cow's milk is greatly at variance with that of the fat of human milk, differing especially in its far greater contents of volatile fatty acids among which butyric acid is the most important.

Fifth.—Butyric acid is the mother substance of the acetone bodies to the presence of which a number of disorders, to which the infant is prone, have been ascribed by various observers.

Sixth.—Butyric, caproic, caprylic and capric acids are contained in the fat of cow's milk in from six to eight times the amount in which they are present in that of human milk.

Seventh.—The infantile organism cannot cope successfully with the fat of cow's milk even in a mere physical sense. This is evidenced by the decidedly smaller absorption of the fat-compound derived from cow's milk than from human milk. The occurrence in the feces of absolutely and relatively larger amounts of fat of cow's milk is *prima facie* evidence of its more incomplete utilization by the youthful organism.

Eighth.—As the physical and chemical properties of the milk-

fat are dependent upon the absolute and relative amount of lower and higher and uncombined fatty acids, it is evident that the vast discrepancy existing between the constitution of cow's milk-fat and mother's milk-fat cannot be overcome by any possible modification of the former.

Ninth.—Apart from the butyric acid origin of the acetone bodies we find that the volatile fatty acids as furnished by the fat of cow's milk are decided irritants of the delicate intestinal mucosa of the infant. The ingestion of these acids is, therefore, the primary cause of many instances of gastrointestinal irritation and disease followed by under-nutrition, bodily retrogression and athrepsia infantum.

Tenth.—Alteration in the fat-supply as exercised to-day is almost without exception a quantitative one, consisting of reduction, suspension and even increased supply of fat-aliment.

Eleventh.—Withdrawal of milk-fat in hand-fed infants frequently results in cessation of the local disturbance. It is, however, obvious that the infant cannot exist for any length of time without fatty ingesta of some kind. Furthermore, the incipient marasmic condition cannot be relieved unless a sufficient amount of assimilable fats yielding but insignificant amounts of volatile fatty acids is added to the nutriment.

Twelfth.—Yolk-fat seems to be the ideal fat for infants suffering from chronic gastrointestinal disturbance together with latent or even pronounced athrepsia infantum.

Thirteenth.—Yolks should not find employment in the newborn nor in the infant which thrives on the physiologic nutriment or on a modification of cow's milk. Yolks should be used only in those pathologic conditions which may lead to athrepsia infantum and in those which are due to, or aggravated, by the fat constituents of the nourishment.

Fourteenth.—There are two essentials which must be followed for good results from the ingestion of yolks, viz., the yolk-fat must completely replace the milk-fat, and the amount of yolk-fat, without being in excess, must be adequate, that is, it must conform to the caloric and nutritive demands of the organism.

Fifteenth.—The electrical conductivity of skimmed milk plus physiological amounts of yolk-fat is probably somewhat greater than that of native milk.

ALBUMIN IN THE URINE OF APPARENTLY HEALTHY CHILDREN; RENAL AND CARDIOVASCULAR CHANGES IN CHILDREN AS SEEN IN SOUTHERN CALIFORNIA.

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Albumin is not infrequently found in the urine of children who are apparently healthy, at least we cannot demonstrate the presence of any disease *per se*. Jackson* observes this to occur after cold baths, due to overfilled renal vessels which have been distended by the surface blood and an albuminuria resulting. The Germans have observed it in the new born,† and Dohrn‡ in children and young people.‡

I confess that we are at a loss to correctly interpret these findings, in the light of our present knowledge, in children who present no cardiac or arterial lesions characteristic of nephritis, and in those whose arterial pressure is normal. We, of course, do not regard the transient presence of albuminuria as evidence of nephritis. Many, many times had Keating discussed this problem with me, and during the latter years of his life, our conclusion was that the growing kidney occasionally presented a urine containing both albumin and epithelial cells when, as far as our methods of precision would take us at that day, we were unable to say that either the cardiovascular or the renal apparatus was organically at fault. Time has shown that we were probably correct, as some of these children that Keating and myself studied are now adults between twenty-five and thirty years of age, and members of families with whom I am personally familiar. They are now healthy men and women, without demonstrable renal or cardiac diseases. An interesting point in the endeavor to explain the occasional presence of albumin in the growing kidney is that, in those cases of young children or

* *British Medical Journal*, 1873, quoted by Landon Carter Gray. *American Journal of the Medical Sciences*, October, 1894.

† *Virchow's Gaz. Abhndlg.*, 1856.

‡ Dohrn, *Monat f. Geburtsch.*, Bd. XXIX.

young adolescents who have a floating kidney and are submitted to palpation of the organ, they sometimes have albumin subsequent to the examination, when the urine has been free before the manipulation of the abdomen. Dorning has had such an experience, and Packard states that he had a patient under his care who had a movable kidney and whose urine had been albumin free, but if he finds, after analysis, an albuminous urine the abdominal pad has become deranged and the kidney is found displaced and free to move. When a child with albumin and no apparent kidney or heart disorder is presented to this careful observer, he looks with especial care into the question of the presence of a movable kidney. There seems to be a general impression that floating or movable kidney is not found in children. This is erroneous. Abt, Ballantyne, Hollederer, Baron and Knoepfelmacher all agree with this statement, and a careful examination of all children will show that the disease is not as infrequent as we have been taught to consider it.

Comby (*Arch. de Med. d. Enf.*, Paris, 1898, Vol. I., 595-658) has recently recorded 18 cases, varying in age from one month to ten years and over. As in adults, so in children, females are more prone to the abnormality than males. In this series 16 were girls and but 2 were boys. In 2 the affection had been mistaken for chronic appendicitis. Still, of England, records movable kidneys in very young infants seen both ante and postmortem, and Fisher, of Bristol, a movable kidney in an infant aged eighteen months.

Litten, Gutterbock, Ewald and Albarran believe that floating kidney, at this early period of life, is a congenital defect, but it is difficult to say why girls are more prone to the defect than boys. Comby advises fixation in children, and adds that in his hands it has been attended with the best results.

That direct manual compression of the kidneys may, under certain circumstances, cause albuminuria does not seem to have been widely recognized. Schreiber has recently given us the apt term—renal palpatory albuminuria (*Zeits. fur Klin. Med.*, p. 55)—although Menge had previously described the symptom complex.

The duration of this albuminuria is short; in one of our cases it lasted but ten minutes after the palpatory examination. When albumin is present under these circumstances, the urine will generally show physical and microscopic changes. It may be lighter in color and contain an excess of phosphates. The microscope

will show epithelial cells and sometimes red blood corpuscles and leukocytes, which may be either partly polynuclear or partly mononuclear, or they may be almost exclusively lymphocytes. In no instance have I found true tube casts in this renal palpatory albuminuria. In differentiating obscure abdominal tumors, palpatory albuminuria may be of great value. It may obviate the necessity of catheterizing the ureters in a child—a procedure sometimes most difficult of accomplishment.

Let me cite the pertinent experience of Winters (ARCHIVES OF PEDIATRICS, September, 1901, p. 683), who had under his care a girl twelve years of age, in whom, in spite of every care, albumin appeared regularly, though she had never given any other evidence of kidney disease. At one time she was kept in bed for four months, on a milk diet for two months of that time, and no albumin appeared during the entire period. Soon after getting out of bed albumin appeared again; the child was then sent to California, where she has been for two years, living during the entire period as other school children live, and there has been no reappearance of albumin.

In anemic, feeble strumous children, in whom no lesion of the kidney can be made out, the hematogenic albuminuria of Semola must not be forgotten. In these cases, from serious alterations in the constituents of the blood transudation of albumin occurs, while the kidneys are intact. Our California experience in a large number of referred cases is that in those cases which will eventuate in demonstrable pathologic lesions, the cardiovascular changes become recognizable very soon after the albumin is detected; indeed, in many instances the cardiac and arterial changes precede the renal alterations. This is as true in the child as in the adult. The albuminuria, then, in which there are no demonstrable lesions in infancy, childhood, adolescence or later life would seem to be of a different character from the albuminuria of Bright's disease. This is again in accordance with Semola of Naples, who for more than thirty-five years has claimed that the albumin in Bright's disease is a different form of albumin from that in other lesions.

This, of course, opens up too large a discussion for this communication, so we must refer to the researches of Meissner, Brücke, Schutzenberger, Kühne, Neumeister, Chittenden, Crofton, Stewart and others. Suffice it to say, however, that there seems to be no question at the present day that there are different albumins in the urine. Upon the recognition of these depends

the diagnosis of nephritis from other diseases. Many cases may excrete abnormal amounts of the terminal products of nitrogenized and hydrocarbonaceous metabolism and not be the subjects of either renal or cardiovascular change. I do not wish, however, to convey the idea that it is our opinion that the abnormal urinary products are always due to faulty food supply. In some of the pampered children of the wealthy, of whom great numbers come to California every year, we have thought that perhaps an unstable nervous system was responsible for the albuminuria and the altered metabolism. Others we have come to consider among the class that Goodhart so aptly terms "a queer lot"; that is, the offspring of those whose nervous systems are feeble or diseased, or who are closely related to those who have, or have themselves been the subject of fits, hysteria, neuralgia, rheumatism, convulsions of infancy, passionateness, morbid timidity, or chorea. A number of these cases of albuminuria without renal lesions come to California every winter, sent by their eastern physicians with a diagnosis of renal disease. These are the children who do well so quickly in this climate, and who return in a short time to their homes, perhaps without albumin in the urine, with increased blood supply and all the appearances of good health, and encourage the medical man to think that he has saved the child from kidney disease, when a more careful study of the case would place it in its proper category of transitory albuminuria without demonstrable lesions.

The frequent presence, I may almost say normally, of nucleo-albumin in the urine in quantity which will react to test solutions containing tannin, mercury or a vegetable acid, must never be forgotten. This applies to some of the most popular tests—as Tanret's, Millard's, Sebelein's and even to Spiegler's and Jolles', so recently commended in the *Journal of the American Medical Association*, December 3, 1904.

Three reagents, now much the fashion, will also prove fallacious in this respect, namely, picric acid, particularly the citrated solution, metaphosphoric acid and trichloroacetic acid. Stewart, of Philadelphia, it was, I think, who about ten years ago pointed out that a reaction could be so often obtained with the urine of the healthy, that unless this was remembered it would be infinitely better to depend upon the less misleading, if less delicate, tests which time has proven to be reliable; after all is said and done, boiling and the addition if necessary of acetic acid is still

the most reliable, because the substances reacting to the more delicate tests are apt to be a mucoid body, originating in all probability from the cellular elements of the extra renal passages, as Stewart has told us, or a nuclealbumin. Before sending these little patients so far away from home, it would be well to determine absolutely whether the urine contains serumalbumin, serum or paraglobulin, nuclealbumin from bile, mucin from bile, or mucin from mucous membrane, albumoses or the so-called urinary peptones.

It is well to further remember that a serumglobulin is almost always found in the urine which also contains serumalbumin. If the contrary is found, the probability is that not serumglobulin but nuclealbumin is present. Again must be remembered the frequent association of serumalbumin with a mucinuria, that is, a nuclealbuminuria. To repeat, then, the old-fashioned test by boiling is still the most reliable one for serumalbumin. The two main fallacies in this test, besides those so well known, are: First, the reaction of nuclealbumin after cooling; second, an excess of earthy phosphates in strongly nucleous albuminous urine.

Having made this brief mention of the cases of children who come to Southern California by the advice of their physicians with supposed renal disease, when the kidneys and vascular apparatus, as far as we know, are intact, let us take up the large class of children who come every year with demonstrable renal and circulatory disease, little sufferers in whom the lesions are as marked as in the adults. These cases may for a time be without albumin in the urine; but a careful study may show casts and renal epithelium, and a centrifugal examination should always be made of the fresh urine. Interstitial nephritis, now known to occur in children, may temporarily have a nonalbuminous urine; very occasionally it may be absent throughout the course of the case. Some clinicians still deny the common occurrence of chronic interstitial nephritis in little children. Too many cases will be seen by the careful worker to accept this dictum of the text books. Frequently I see children whose urine has a continued low specific gravity, albumin and tube casts, children who present uremic symptoms and who have an accentuated second sound, cardiac hypertrophy, increased tension, a train of symptoms that would seem to indicate, and indicate alone, the presence of chronic interstitial nephritis. Clemens (*ARCHIVES OF PEDIATRICS*, March,

1905) sees many such cases. So also do I see a number of cases of chronic parenchymatous nephritis in young children, terminal cases from either measles, scarlatina, or diphtheria, children who are sent to California to convalesce from one or other of these maladies, many of whom recover. A number, however, do not, and pass into the chronic stage, dying from kidney lesions from the tenth to the twentieth year.

Nephritis following the acute exanthemata in children has of itself a tendency to recover. This recovery can often be made complete by a prolonged residence in Southern California. The acute form of nonsuppurative interstitial nephritis is in fact more often met with in children than in adults, because the infections which produce it are more often seen in children. It follows diphtheria, measles, cerebrospinal meningitis, varicella and pertussis.

Leube and Chateauburg found albumin in the urine after prolonged and fatiguing exercise in over 16 per cent. of the individuals examined; this so-called physiologic or functional albuminuria is due to circulatory disturbance in the renal vessels, but the kidneys *per se* are intact. It is due to an increased blood pressure from either a slowing of the venous current or an acceleration of the arterial current. The quantity of albumin under these circumstances is small, but if the circulatory disturbance becomes permanent the albumin speedily increases in amount. I see many children who come to California to convalesce from acute attacks of rheumatic involvement of the heart who present serumalbumin in the urine; but all of these cases have not deranged kidneys, and will probably escape renal involvement if the condition is recognized soon enough. A class of little patients of whom much is seen in Southern California are the children who are sent to convalesce from a long run of one of the infectious fevers. Here the blood pressure has been high for some time and the long continued febrile state has probably set on foot structural changes in the renal epithelium and marked alterations in the circulatory fluid. The little ones come to us with albuminous urine, and in these cases again, if the condition is early recognized, the kidneys may be saved. It is never safe to consider albuminuria other than a symptom and not a proof of the presence of renal disease in the child, unless it is accompanied by the products of renal lesions—tube casts and epithelium. Furthermore, it is well to remember that albumin may occur in the urine from sources other than the

kidneys. Also must we bear in mind that, in addition to the four proteids of the blood—namely, serumalbumin, serunglobulin, fibrin, and hemoglobin, seen in the urine in various conditions, in the young child who has been allowed a too liberal ingestion of eggs, there may be egg albumen in the urine and, under certain further conditions, peptone, and also that proteoses, the more prominent of which are protoalbumose, deuterioalbumose and heteroalbumose, may be met with in the urine in pathologic conditions of early adolescence. To us, of course, serumalbumin is of the greatest interest and of the most significance, so that the simple fact, so often sent me with the notes of a referred child, that the urine contains albumin, is no longer satisfactory in the light of our present knowledge. We must determine and record the form of albumin as well, else our record will be of little value in the clinical interpretation of the symptoms, the guidance of the case or the prognostic determination, which is of such great interest to the parents.* With our present knowledge how little significance would there be, for example, to find an albumose in the urine of a child suffering from pneumonia or diphtheria, conditions which have presented this intermediate proteid; but how grave might it be if the finding was serumalbumin, and how unfortunate would it be to confound one with the other. Peptone, so well worked out by Kühne and Chittenden, has been found in the urine of the child suffering from scarlet fever, mumps, empyema, psoas, abscess and tuberculosis, and here again must it be recognized from serumalbumin, else will the prognosis be too grave. Jaksch tells us of another reason for care in differentiat-

* After many years, I still like the test for albumin which is known as Purdy's. While many of the newer tests are exceedingly sensitive, still we feel that their sensitiveness is secured by the sacrifice of their reliability. A personal communication from D. D. Stewart, of Philadelphia, under date of May 8, 1905, contains these statements: "Now, while I have conclusively proved the presence of a trace of albumin, and that probably serum albumin normally in the urine of all, by the trichloracetic test, I can also show that the heat and acetic acid properly applied is almost as delicate. I always add a drop or two of 10 per cent. acetic acid, even if the urine is already acid, but in the latter case not until I have first boiled it. I boil the upper portion but compare with the lower unheated, and then always use the same shade, an electric light with a very dark green cover."

The reaction of filter paper to the trichloracetic test must be remembered. Stewart adds: "Filtering an absolutely clear urine is a mistake in testing for albumin when a very delicate test is employed; the filter paper contributes its quota."

ing, as he insists that a diagnosis may be made between tubercular and epidemic cerebrospinal meningitis by the presence of peptonuria, which is absent in the former and present in the latter.

Maixner's law should be recollected; peptone is always present in the urine when pus is forming in the body. Globulin is nearly always associated with albumin in the urine, and its significance in the child is about the same as in the adult; in both periods of life it is nearly identical with an albuminuria. All the albumins, proteoses and peptone may be present in a single specimen of urine. It is unusual, but it does occur, and Halliburton's method of testing will differentiate for us. Pavy has shown that hemoglobin may be present in the urine without any of the corpuscles. I have seen this hemoglobinuria in children after extensive burns. In making up the prognosis in these serious cases it will be necessary to determine whether it is a hemoglobinuria or an albuminuria, which may be readily done by the Heller test; if hemoglobin is present, a mottled precipitate of albumin and hematin will be obtained. Reissner has shown that a mucinuria in the febrile state often precedes an albuminuria, and that while the albumin may disappear in a few days the mucin persists for some time. The significance of this knowledge in pediatric practice need scarcely be mentioned, but we cannot refrain from noting its importance in scarlatina and other acute infectious diseases of childhood, where its importance is twofold; not only does it put us on our guard against an impending nephritis, but a mucinuria may be mistaken for an albuminuria and an incorrect diagnostic and prognostic statement may be made to the parents. In conclusion, we must never forget the authoritative words of Councilman, uttered in 1897: "The chemical and microscopic examination of the urine, important as it is, does not give any sure information as to the character of the renal lesions."

Cabot,* incited by this statement, has recently recorded his findings, which seem to warrant the following conclusions, which are pertinent to our present study: First: Many cases of acute glomerular nephritis occur that are unrecognized by any known methods of examination. Second: The microscopic and chemical diagnosis is only at fault in some cases of subacute and chronic glomerular nephritis. Third: In chronic interstitial nephritis, while the diagnostic methods are not as exact as in chronic glomerular nephritis, still they are not as inadequate as in acute

* *Journal American Medical Association*, March 18 and 25, 1905.

glomerular nephritis. Fourth: In conditions involving passive congestion or acute kidney degeneration, the urine occasionally simulates that of acute nephritis. Fifth: Even when no lesion is found at autopsy, the urine is sometimes highly albuminous and full of casts. Cabot holds that the common errors in urinary examination are, the attempts to estimate urea without accurate knowledge of the patient's metabolism, and the conclusion that renal cells are present when all that is seen are small mononuclear cells, perhaps from the kidney, perhaps not. He further holds that the vast majority of estimations of urinary solids, including urea, are a waste of time, as they cannot be made part of a general metabolism experiment, and the attempts to estimate the anatomic condition of the kidney by measuring albumin and by searching for casts is fallacious. His conclusions, then, are that the most reliable data are twenty-four-hour quantity, specific gravity and color.

But a few words in regard to the general plan that we have adopted for the past sixteen years of handling these children in this most suitable climate. First: The open air treatment is indispensable if we hope to deal effectively with chronic renal disease in a child. It is our main curative agent. Second: Never despair in treating a case of chronic nephritis in a child. Recovery often comes only after a long and weary struggle. We lay as much stress on the outdoor life for these children as the internist does with his cases of tuberculosis. In fact, this life in combination with dietetic and cardiac supervision and eliminative treatment is the only plan that offers a successful termination of our efforts.

Most of the waters of Southern California are too heavily charged with minerals to aid our purpose in these cases, so it has been our custom to forbid their use; among the wealthy to use Poland water, and among those of limited means distilled water, in large quantities for kidney flushing and elimination, recognizing, of course, the limitations of distilled water.

We always allow the growing child some nitrogenous food, sparingly, however, nor do we allow the child to suffer the pangs of hunger from too strict limitation of the diet. If they waste, more food is allowed. Milk, as in the adult, is the ideal food for the child, and is well borne in most cases; but we always, in addition, allow the light animal broths and the white meats and white fish. With active skin, bowels and lungs, our little patients will require but little, if any, drugging. The state of the heart

and circulation is the great factor in prognosis. If we can strengthen and aid the left ventricle, relieve tension in the right ventricle and reduce the high arterial tension to or near the normal, we have done much to prevent the disease from becoming chronic and the little patient the subject of an advancing renal disease. We advise that these children should not be sent to Southern California unless they are prepared to remain two to five years, or perhaps permanently.

Caillé (ARCHIVES OF PEDIATRICS, October, 1904, p. 760) would submit the tardy cases to inspection of the kidneys through lumbar incision, provided the nephritis was not secondary to cardiovascular changes. If one or both kidneys should appear swollen and enlarged, he would split the capsule or decapsulate with the hope of preventing a nephritis which had persisted from six to eight months from becoming chronic. This observer believes that some of the virtues of decapsulation are due to massage incident to handling the infected organ. He reports the case of a girl who was four and a half years old at the time of operation, who had suffered from Bright's disease for two and one-half years previously, and who was at the time of the report seven years old, having been without demonstrable lesions for two years. As far as it is possible to determine, the child has perfectly recovered. Many children have now been operated upon, but the matter is all too recent to formulate definite results, and at present, in children at least, the procedure seems only to be justified in the presence of renal insufficiency, where observers seem to agree that the results are better from decapsulation than from medication.

Head's Zones in Children. — Bartenstein's experience (*Jahrb. für Kinderhk.*, Vol. LVIII., No. 3), at Breslau, confirms Head's assertions in regard to the increased sensitiveness of certain zones of the skin in case of affections of the internal organs. He found them frequently in children over three years of age. These findings will explain a number of hitherto mysterious phenomena which have been ascribed to hysteria or neurasthenia. He also found that the trembling of the muscles of the eyelids when the eyes are shut is of frequent occurrence in the offspring of neurasthenic parents. He found the Head zones in 46 cases of various internal affections, and believes that it may prove possible to influence the internal affection by revulsion applied to these zones.—*Journal of the American Medical Association.*

THE ETHERIZATION OF CHILDREN.

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The administration of anesthetics to children is an art which requires an unusual degree of skill and tact on the part of the anesthetizer, and the greatest care must be exercised to prevent the overdosing of the little patient, with the resulting increased shock and lowered vitality. Children are very susceptible to anesthetics, and it is not an infrequent occurrence to see a child change suddenly from a condition of safety to one of danger from the addition of a single drop of chloroform or twenty or thirty drops of ether.

As the title indicates, this paper deals only with the administration of ether to children—for the writer believes that ether is the safest and best of the anesthetics for young subjects and has the least objectionable features—provided it is given properly. Our experience with medical students is that, when first called upon to give ether to a patient, their idea is to pour ether on a cone or gauze at frequent intervals, and, having the patient completely unconscious and relaxed, to continue this pouring on of ether at intervals of about thirty seconds until the surgeon has completed his work. It is difficult to impress upon the student's mind that quite long intervals may be allowed to pass without the addition of a single drop of the anesthetic, and yet the balance be so carefully maintained that the patient will remain completely relaxed throughout; and, furthermore, while still on the operating table and the dressings being applied, will already show signs of coming out of the anesthetic.

The degree of shock to the nerve centres by a prolonged etherization is very considerable, even when the ether is properly administered; and when too much is given and the patient so completely depressed that he shows no signs of returning consciousness for an hour or even longer after the completion of the operation, the depression and shock may be so great that it may actually be a determining factor in the life or death of the patient.

The vitality of children is very easily lowered; their bodies are often slight and frail and wasted by disease, as in those cases of prolonged suppuration in the hip joint, or spinal caries. It is

in these instances that every precaution must be taken to conserve the bodily heat and energy.

There are but few occasions in which ether is not to be given in preference to other anesthetics. The most important of these is an abnormal state of the respiratory organs themselves. It would be a safe rule to follow never to give ether to children during an acute bronchitis, pulmonary congestion—however slight it may be—or pneumonia. The danger of pulmonary edema, or a rapidly fatal pneumonia, must always be considered in these cases, and only in those of great emergency would it be warrantable to etherize these patients, and even with other anesthetics the danger is very considerable. The writer recalls at the present moment several cases among intimate personal friends who were well enough to walk into a hospital for operative treatment, which was considered in no way dangerous, and who died of pulmonary complications which resulted undoubtedly from the anesthetic. It is these unfortunate accidents which are deplorable, and which must be guarded against at no matter what inconvenience or delay. It should be a rule, that all such operations upon children as the removal of tonsils or adenoids, an internal operation for appendicitis, osteotomy or tenotomy, cleft-palate and hare-lip, excision of the hip, hernia, and others of like character, in which there are diffuse râles throughout the chest, cough, hoarseness or loss of voice, congestion of a lobe, with slight rise in temperature, any or all of these symptoms should cause the operation to be deferred to a more favorable time. Twenty patients might bear the anesthetic well and apparently suffer no ill consequences; and yet, on the other hand, any one of the series might die, and remain as an everlasting reproach to the better judgment of the operator or his anesthetizer. It is unnecessary to add that in emergency operations, such as a virulent appendicitis, strangulated hernia, intestinal obstruction, perforation in typhoid fever, and other like conditions, operation must be performed at once, no matter what the risk; and under the conditions which we have enumerated, chloroform would be the anesthetic of choice; and for short operations chlorid of ethyl as a general anesthetic will no doubt prove of great value. It should be mentioned that children suffering from adenoids not infrequently have a slight cough, which is due entirely to the accompanying catarrhal condition of the upper air passages. In these cases

the removal of the growths is, of course, distinctly indicated, and the writer has never seen any bad results from the use of a general anesthetic.

In regard to nephritis, ether, if it is properly administered and not given in overdose, need not be considered an anesthetic of unusual danger; and it is not unreasonable to suppose that the custom, which prevailed much more a few years ago than it does at the present time, of depriving abdominal cases of water for twelve or twenty-four hours or longer after operation, has been responsible for a considerable number of the cases of uremia, especially those in which there had been a slight pre-existent nephritis. Water should be given in small quantities as soon after the operation as possible; that is, as soon as the irritability of the stomach subsides, and then given at frequent intervals in increasing quantity. Ether should not, of course, be administered to patients with nephritis when it can be avoided; but when an anesthetic is absolutely necessary ether may be given.

In etherizing a patient with heart disease constant watchfulness is necessary. With the exception of cases of extreme or grave cardiac conditions, however, these patients can be brought safely through the anesthesia without any unfavorable symptoms.

Cases of profound anemia are always a source of anxiety—they are much more susceptible to shock, and the anesthetic increases the depletion of the blood. Where the hemoglobin is at 35 per cent., or below, the anesthesia must be of the shortest possible duration and ether used most sparingly: and even so the danger to life is very great.

In the bad accident cases which are brought into the hospital, children crushed by trolley-cars, or in railway accidents, ether may be given, and it is possible to perform a quick amputation of a crushed limb, or set a broken bone, without inducing a profound anesthesia; and ether given in this way will act as a stimulant upon the circulatory organs. Prolonged or excessive ether will put such an additional depression upon the already existing shock that, as a result of the two combined, the patient may not survive.

The depth of the anesthesia in these cases is most important, for the patient must not be allowed to suffer unnecessary pain; this of itself will increase the shock. When, therefore, we find ourselves confronted by so difficult a problem, a child, perhaps, with a crushed limb requiring amputation high up in the thigh

and in a condition of profound shock, the writer believes that the best chances for saving the patient's life will be obtained by inducing a light anesthesia with ether, blocking the great sciatic and the anterior crural nerves by a cocain injection a little above the point of intended division, and then doing as rapid an amputation as can be done with safety. There can be no doubt left in the minds of those who have followed closely the researches of Harvey Cushing and Crile that the division of great nerve trunks close to the spinal axis, whether the patient be lightly or deeply anesthetized, inflicts a sudden shock to the nerve centres, followed instantly by a fall of blood pressure; and this may be so decided a factor that it will turn the balance against the patient and a fatal termination be the result. The writer has observed this in amputation at the hip.

The most suitable time for operating upon children is in the morning, for at this time the child, if he is not apprehensive in regard to the operation, has been refreshed by his night's sleep and is not kept waiting through long, tedious hours for the arrival of his doctor at some hour in the afternoon. Children of ten or over not infrequently realize the true meaning of an operation and become somewhat nervous and anxious as they look forward to the appointed hour; but this never, so far as we have been able to observe, interferes with sound sleep, unless the child is kept awake by pain or the discomforts attending his condition.

The preparation of children for the operation and anesthetic does not differ materially from that of adults—the bowels should be thoroughly evacuated by a laxative given in the late afternoon of the previous day and the lower bowel washed out with an enema in the morning. Solid food should be absolutely forbidden on the day of the operation. The writer has known children of fifteen years to vomit food—as soft-boiled eggs, milk toast, etc., etc., in the identical condition in which they were swallowed, six hours after the meal had been taken—the whole process of digestion having been arrested by the nervous condition of the patient. In consequence there was much annoyance and delay in anesthetizing these patients, and they rarely took the ether well. If an operation is fixed for eleven o'clock in the morning, a cup of broth may be given at seven, unless there is some definite reason for not doing so, and water may be given at the same time; but absolutely nothing in addition. The fluids are promptly

absorbed from the stomach and four hours later the child should be in excellent condition for the anesthetic.

An absolutely pure ether should be used and that which is administered directly from the can is less irritating than ether which has been exposed to light and air for some time. A convenient method is to have at hand several of the small tins holding $3\frac{1}{2}$ ounces each. By making two small perforations in the top the flow of ether can be perfectly regulated, or, if preferred, an ether bottle may be used. These are especially prepared for this purpose, but, as a rule, are no more satisfactory than an ordinary glass bottle having a cork which is notched on opposite sides, or placing a folded strip of gauze in the neck of the bottle allowing about an inch to project over the margin and then replacing the cork—this permits the ether to fall off the gauze by a continual dropping, the rapidity of which can be regulated by the thickness of the folded strip and the tightness with which the cork is inserted. In using the ether directly from the tin can, it will be found that by placing the index finger over the holes in the top and allowing the ether to trickle off the tip of the finger, the freedom of the flow can be readily regulated by the pressure of the finger.

The open method of administration is the one which should be adopted always; that is, an abundance of fresh air should be allowed the patient. The various forms of closed apparatus which were modeled after the Clover pattern are now but seldom used. In fact, the principle upon which they depend seems unscientific, the patient breathing again and again his own expired air mixed with ether vapor, and succumbing as much to suffocation from accumulated excess of carbon dioxide as to the therapeutic action of the ether itself. In order to lessen shock and preserve bodily heat and energy, the vital activity of the tissues should be kept up to its highest point, and for this purpose an abundance of oxygen is necessary, and this can best be supplied by pure, fresh air; and if this is permitted there will rarely be any occasion to give ether and oxygen in combination. The inhalers which are most satisfactory are either plain gauze, folded or cut into about twenty layers, and this may be conveniently clamped in a small wire frame which will make a hollow hemisphere of the gauze about the size and shape of a shallow tea-cup, or the Allis inhaler may be used. Senn's ether cone is very satisfactory—a wire frame for supporting a cone made from a

towel folded over cardboard and left open at the top, where a loose piece of gauze or a sea-sponge is placed and the ether poured on from above. The writer prefers the Allis inhaler to all other types, and is much more familiar with its use. A small size should be ordered for children, for it must be only large enough to rest comfortably over the nose, mouth and chin without including the eyes of the patient, as is the case if the larger size is used on a child. The ether vapor if administered from a towel or other appliance which will cover the eyes will cause so much irritation of the conjunctivæ that they will become deeply congested and may cause the patient discomfort for a day or two following the operation. It is quite customary to cover the eyes of a patient with gauze or a folded towel in order to protect them from the ether fumes; but we prefer not to do this with children, as it is far more apt to frighten them than if the eyes are left free and a child is permitted to look about as he wishes; children become apprehensive and distrustful when the eyes are covered and are much more apt to reach up and push the cone away. As a rule, if the eyes are uncovered they will gaze steadily up into the face of the anesthetizer until drowsiness overtakes them—the lids begin to droop and close, and the little patients sink quietly into unconsciousness.

For children, therefore, the smaller size of the Allis inhaler should be used; this should have a clean, folded towel pinned closely about it, which is permitted to extend about an inch below the lower margin of the cone. This will then fit snugly over the bridge of the nose, the cheeks and chin and leave the eyes entirely free, and at the same time prevent the escape of ether vapor into them. The open end of the cone should always be allowed to remain free and unobstructed, admitting pure air without restraint, and never should it be necessary to cover the cone with the palm of the hand or a towel; this defeats entirely the principle upon which the inhaler is constructed, *e.g.*, to allow the patient an unlimited amount of air, which is saturated more or less, according to the requirements of the moment, with ether vapor. When once in place the cone need not be removed throughout the entire operation, unless it be to remove accumulated mucus from the throat, or in case of accident.

In addition to the inhaler the anesthetizer should have at hand two or three sponge-holders with tufts of gauze clamped firmly in the ends, and before using these it is always well to test the

grip of the sponge-holder upon the gauze before passing it back into the patient's throat. When these sponge-holders are clamped quickly on the gauze and handed to the anesthetizer by the nurse during the operation, the gauze may be so insecurely fastened that it may be lost in the patient's pharynx, causing no little delay and embarrassment. There will also be a tongue forceps, although this will scarcely ever be required during a well-conducted anesthesia; a hypodermic syringe, with tincture of digitalis, strychnia, atrophin, nitroglycerin and aromatic spirits of ammonia; some pieces of cut gauze and one or two towels. There should always be an extra can or two of ether within reach.

If the child is very much reduced from prolonged disease and the operation is apt to be a long and dangerous one, as an excision of the hip, every precaution must be taken to preserve the vital forces as much as possible, and the child's body should be entirely swathed in cotton batting, bound on comfortably with a bandage, except that part which must remain exposed for operation; or an electrotherm may be used on the operating table—a rubber mat which is heated by electric coils and can be raised to any desired temperature. It is covered by a sterile blanket or sheet and will keep the child warm throughout the operation. It becomes the duty of the anesthetizer to regulate the temperature by means of the electric switch. It should just be comfortably warm to the hand and never hot enough to produce sweating. It will be found a most valuable aid in saving animal heat. Under no circumstances should the child's body rest against the glass top of the table. As a rule, it is better to anesthetize children in their own rooms and when unconscious carry them to the operating table in an adjoining room.

It is well to spend a minute or two in conversation with the little patient about his toys or playmates and, if he is old enough to understand, to explain to him that the operation which is about to be done is necessary to make him well; that without it he will not grow up to be strong and healthy as his playmates are. The child should be told that if he will be quite still and breathe through the ether cone a few times he will go quietly to sleep and will not feel any pain and will wake up again and find that everything is finished.

After a careful examination of the heart and lungs, and already knowing the condition of the kidneys and the blood (the latter

only in case the child is anemic), having ascertained that the bladder is empty and that there is no loose object in the mouth, the ether and inhaler may be brought in and the child allowed to handle and examine the latter. If he holds it up before him he can see the light coming through between the folds of gauze bandage, and will then more easily appreciate that he can breathe easily through the inhaler. There should be no one in the room save the nurse and anesthetizer. It is far better not to have the parents present. The mother may be permitted to remain seated at the foot of the bed, or close at hand, provided she remain perfectly quiet. There should be no conversation in the room, no sound of a sudden or startling nature, as the slamming of a door; no one should speak to the child save the anesthetizer himself. Whoever has been present at the anesthetizing of children in private houses has no doubt witnessed scenes of great confusion—five or six persons standing about the bed, all advising the patient to take deep breaths as the doctor told him—not to be afraid—that his mother has hold of his hands—the father adding his advice—a nurse holding down the knees of the terrified and struggling child, while the doctor is endeavoring to smother his screams under the ether cone. All of this is injurious to the delicate nervous organization of the patient and should be avoided wherever possible. There should be no one but the nurse in the room—she seats herself on the edge of the bed close to the child's body. On the opposite side the anesthetizer sits facing the child; he tells him to clasp his hands tightly together, interlocking the fingers, and to hold them firmly (Bodine). It is of the greatest importance not to deceive the child; having once won his confidence, it will ever after be lost if he realizes that his trust has been betrayed. If, then, the patient's attention can be definitely fixed upon some object or purpose and held steadfastly to it, the first stage of anesthesia can be reached without the slightest difficulty or delay. The child's mind is elementary; the ideas are relatively few, and the attention is readily arrested and held. For this reason, children are extremely susceptible to suggestion, and are on this account much more readily hypnotized than are adults. We can take advantage of this principle in the giving of ether, and when we place the cone over the child's mouth and nostrils we tell him to keep his hands tight together and to keep squeezing them tightly all the time. The patient instantly does as he is told, almost without exception, and we assure him that

he can breathe without any difficulty and that he is breathing only the fresh air. We then tell him that we are going to put a single drop of ether upon the inhaler, so that he can get accustomed to it gradually, and then, telling him again to keep his hands tightly clasped, we allow him to take a half dozen breaths, then two or three drops of ether are added—in a few seconds ten or fifteen drops—and after a slight interval, twenty or thirty drops about as rapidly as the ticking of a watch. There may be one or two slight coughs. It is unnecessary to make any reference to the breathing, let the child regulate it to suit himself; but he should be told repeatedly to keep his hands tight together, and if he seems at all nervous he should be quietly reassured. Ether should now be allowed to fall by a continual dropping about as rapidly as one could count the drops and continually passing up and down over the open end of the inhaler. In less than two minutes, in the great majority of cases, the eyelids will have closed, the breathing will be quiet and regular, and the child will have fallen into unconsciousness without a single movement and without uttering a sound.

If, now, the lid is raised it will be noticed that the pupil promptly contracts as the light enters it and that it is becoming smaller and smaller, until it reaches a point of maximum contraction at about five minutes from the beginning of the ether. When it is at its maximum point of contraction it is difficult to detect any reflex to light, and if the ether is pushed still farther the pupil begins to dilate and no longer reacts to light, and may continue up to the point of maximum dilation, in which condition the patient may be in grave danger. Therefore, we must endeavor to so regulate the quantity of ether that the pupil shall not reach the point of maximum contraction, but remain just a little on the safe side of it, so that it instantly reacts to light when the lid is raised. If this is the case, we can rest assured that our patient is not receiving too much ether. With the withdrawal of the anesthetic the pupil again slowly dilates until it has reached its normal size, but the reflex to light is always present. Sometimes, however, this contraction is so prompt and so slight that one must watch with the greatest intentness to detect it. The beginner is often confused by the dilation of the pupil, being at a loss to determine whether the patient is receiving too much or too little ether. Children, as a rule, are ready for operation in six minutes. At the end of four minutes, therefore, they may be placed

upon the table and the preparations completed. It is well then to have the child's head slightly lower than the thorax—this drains mucus and secretions more readily from the trachea and larynx and acts as a safeguard against inspiration pneumonia. When muscular relaxation is complete the head should be somewhat retracted and turned well over to the side, being sure there is no constriction about the neck; and this position should be maintained throughout. The child breathes more freely, mucus drains out of the corner of the mouth, and is not so liable to collect in the larynx, trachea or pharynx, and the tongue cannot fall back into the pharynx and obstruct the breathing. When mucus collects in the larynx and causes a rattling sound and seems to interfere with inspiration, the fingers should be placed behind the angles of the jaw and it should be drawn forward, when the air passage will immediately become clear. The excess of mucus may be removed by passing a sponge-holder with gauze directly back through the fauces and mopping out the pharynx.

The ether may be added from time to time as needed. The child can be kept completely relaxed throughout even a prolonged operation without straining or retching. It is *never* necessary to touch the conjunctiva to determine whether or not sensibility is lost, and the careless thrusting of the finger against the cornea has frequently caused serious corneal ulceration. One judges the depth of the anesthesia in several ways aside from the aid afforded by the pupils. If the patient coughs, swallows, moves the fingers, turns the eyeballs from side to side, sighs, breathes irregularly, these signs indicate a very superficial stage of anesthesia. The tonus of the orbicularis palpebrarum will also serve, for the muscle contracts and resists when the finger is placed upon the eyebrow and draws it upward during the lighter stages of anesthesia. On the other hand, when the breathing is stertorous, or quick and very shallow, and the lips cyanosed, the face dusky or very pale, it is an indication usually that the patient is too deeply narcotized. The color of the face is an excellent guide, and also the regularity of the breathing. In the early stages of anesthesia, coughing and reflex arrest of the breathing, with the cyanosis which always follows, is an indication for a continuation of the ether and not a withdrawal of it, in order to overcome the reflex spasm.

The pulse and blood pressure can be conveniently felt at the temporal artery or the auriculo-temporal, the wrist when the

hands are beside the head. In profound shock the pulse can usually best be felt in the carotid artery. In children we do not, as a rule, regard a pulse of 140 as unduly rapid, but its character and regularity are always of importance.

The pupil should be watched pretty constantly and ether should not be poured upon the inhaler until one first ascertains the activity of the pupil to light.

Very little ether is necessary after the operation is started, and an ounce will usually suffice for an hour or longer. From time to time the progress of the operation should be noted and the depth of the anesthesia regulated accordingly. The anesthetizer should never hesitate to call the attention of the operator to the patient's condition; but, as a rule, he regulates the stimulation, when this is necessary, according to his own judgment, in order that the surgeon may give his entire attention to the operation.

If a child is permitted to come partially out of the ether during the operation and begins to strain and attempt to vomit and the breathing is for the moment arrested, the etherizer should pour thirty or forty drops of ether on the cone, but should not renew it—the child, when he begins to breathe, will take such deep and rapid inspirations that the ether is diffused very quickly into the blood, and if too much has been added signs of danger may appear. Therefore one should be content to wait for a few moments and the child soon becomes completely relaxed again. As the operation nears its end the ether may be gradually diminished, so that by the time the wound has been closed and the dressings are being applied the child will turn its head, open its eyes, swallow, sigh, or, in some similar way, show signs of returning consciousness.

Vomiting, should it occur—and it *will* happen in a certain proportion of cases in spite of every care—will usually take place before the child is removed from the table. If the operation has been one upon the throat, there will invariably be vomiting of blood, and usually ten or fifteen minutes later blood will again be vomited. It is just as well to prepare the child's mother for this, in order that she be not unduly alarmed; the bleeding itself will have ceased within a minute or two of the termination of the operation. The child's head should be turned to one side, the angles of the jaw drawn forward and the vomited material received in a towel.

When the pulse suddenly fails during operation, tincture of

digitalis, ℥ ii-v, strychnia sulphate, gr. $\frac{1}{200}$ - $\frac{1}{30}$, or nitroglycerin, gr. $\frac{1}{300}$ - $\frac{1}{100}$, according to the age of the child, should be administered hypodermically. These drugs may be repeated or used in rotation. When the child is much depressed and the skin leaking badly, atrophin sulphate, gr. $\frac{1}{300}$ - $\frac{1}{100}$, should be given. In sudden collapse with arrest of the heart, the child should be immediately inverted—this will usually start the heart again—and a syringe of aromatic spirits of ammonia given under the skin. Ether should never be given hypodermically under these circumstances, as the patient's blood is already overcharged with it. Massage of the heart by direct pressure over the precordium and upper abdomen may be tried, but opening the chest for immediate massage of the heart would hardly be warranted in the present state of our knowledge.

When the breathing becomes completely arrested from sudden depression, the tongue should be drawn forward to clear the throat of obstruction and artificial respiration by Sylvester's method immediately commenced and persisted in for twenty minutes or longer, or until the patient begins breathing. Hot normal salt solution, a pint or more, according to the size of the child, should be run into the median basilic or median cephalic vein, care being taken that the solution in the reservoir is between 110° and 115° F., and that it enters the circulation at a higher temperature than the patient's blood. The solution cools considerably in its passage through the rubber tube, and if it enters the vein lower than the blood temperature it will prove disastrous.

Occasionally children can be etherized while asleep, but it is hardly advisable to attempt to do this, for so great are the chances that the child will be awakened and considerably frightened, that the results are apt to be unsatisfactory.

The facts and suggestions here gathered together cannot be found, so far as the writer is aware, embodied as a whole in any text-book. The object of the paper is to bring out certain facts and principles which, if consistently followed, would rob the etherization of children of much of its anxiety and distress of mind to our little patients, and make of them our trusting and sincere friends for the future, instead of causing them to dread and avoid our very presence.

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THE PRESENT STATUS OF THE TREATMENT OF CONGENITAL DISLOCATION OF THE HIP.

The interest in the treatment of congenital dislocation of the hip, during the past two years, warrants a review of what has been done and a few words as to the present status of treatment.

Until Professor Lorenz, of Vienna, came to this country, in the fall of 1902, no general interest had been shown by the large majority of practitioners or by the laity, although orthopedic surgeons had been studying the subject for many years. Buckminster Brown, of Boston, had faithfully tried recumbent traction. Braces or ambulatory traction had been tested, hips had been re-

duced by the manipulative procedures advocated by Bigelow, Pacci and Lorenz. The operations of Hoffa, Lorenz and others had been fairly tested. The head of the femur had been nailed to the acetabulum to produce a stiff joint and the head of the femur had been excised, and in some cases the excised bone placed in the acetabular cavity, in others left free.

Although occasional cures by various methods had been reported, the percentage of failures was large and the dangers of some of the manipulative and operative procedures were so great as to deter any but the most experienced in continuing the work.

Lorenz demonstrated that in the hands of skillful operators more force could be used than any other operator had ever dared resort to, and thus some hips were reduced that surgeons had thought could not be reduced. He also showed the advantages of replacing the bone by leverage rather than by traction, and introduced new ideas as to the dressing to be applied after reduction, and the position in which the limb should be placed. No accurate record was kept of the number of operations done by him in this country by his so-called "bloodless method," but it exceeded one hundred. His work was not free from accident. Nor can anyone who will perform many reductions hope to escape from an occasional fracture of the femur in the shaft or in the neck, from an occasional case of paralysis of the leg muscles, or from the more serious complication of gangrene of the lower extremity, due to tearing the femoral artery or to pressure of the femoral head against the vessel. Two deaths have been reported in America from this complication. The head of the femur has also been forced through the acetabulum and into the perineum. Sepsis is a rare cause of death in the Lorenz method, but serious abscesses have occurred, as the result of bruising of the tissues by the manipulative procedures, and subsequent infection.

With greater experience the accidents are becoming less numerous and the number of cures increasing, and this is largely due to the interest taken by the profession and laity in the subject. The diagnosis is made earlier and the patient presented for treat-

ment at an earlier and more favorable age than was formerly done, as most physicians, until recently, believed the condition incurable.

As no accurate record was kept of the patients operated upon, so no accurate deduction can be made upon the ultimate results of Lorenz's personal work. In a very large majority of the cases an anterior reposition resulted and but in a small percentage was there a true anatomical reposition as proven by X-ray and careful examination by competent observers two years after the reduction. The large percentage of failure to place the femoral head in the acetabular cavity, and retain it there, has resulted in restricting this method to young children, as the accidents occurred in older cases and the percentage of cures was greatest in the young. The age limit is variously placed, but the bloodless operation should probably be restricted to those under six or seven years of age.

This age limit may be increased as the result of the very clever mechanical device, now in use at the Children's Hospital, Boston, devised by Mr. Bartlett. It fixes the pelvis during the manipulation, and applies traction to the limb and pressure where needed. It is the best of all such devices that has so far appeared and its use may increase the percentage of successes by the "bloodless method."

The age limit is not the only restriction, cases with much distortion of the neck of the femur do not yield good results, nor will the reduction succeed if there is no femoral head or a faulty and much filled-in acetabular cavity. It is the operation of choice in the very young, but if it is not possible to replace the head of the femur in the acetabulum, or if it does not remain in place, recourse should be had to the operation of Hoffa, which consists in cutting down to the joint, dividing the capsule and any and all obstructing tissues and replacing the head of the bone in the acetabulum, with or without gouging it out or deepening it. The operation is a difficult one, hemorrhage is frequently severe and a thorough knowledge of the technic and the anatomy are necessary. Sepsis is the only complication to be feared. Good results

follow the operation in many cases and it is indicated when other measures have failed or where the non-bloody method is contra-indicated.

The report of the orthopedic staff, of the Boston Children's Hospital, on "Congenital Dislocation of the Hip," reprinted from the *Boston Medical and Surgical Journal*, Vol. CLI., states in conclusion, and it is the view of most other observers: "From the experience gained at the Children's Hospital it appears, also, to the writers of this report that stretching the tissues by an efficient machine gives in resistant cases an unquestioned advantage, and permits better reduction with less risks and in older patients, than if operative manipulation alone is employed.

"There is a certain analogy between the treatment of congenital dislocation of the hip and that of club-foot. In the simpler cases, manipulation under an anesthetic is sufficient. In the more resistant cases, correction is helped by mechanical aid; in the oldest and complicated cases incision and osteotomy are often needed to perfect the cure. The present condition of the treatment of congenital dislocation of the hip may seem to illustrate that the world advances by impossibilities achieved. Twenty years ago, cure of this deformity was considered impossible. This in many cases is now easily accomplished."

WISNER R. TOWNSEND.

Faradic Treatment of Urinary Incontinence. — This method of treatment is particularly effectual in children and especially in those who have had incontinence from the earliest infancy. Of 40 subjects, 55 per cent. were cured by Genonville and Compain (*La Presse Medicale*, 1904, No. 38), and 63 per cent. of the children between 6 and 12 years old. The sittings numbered from 5 to 8 in the "congenital" cases, while the others required 6 to 16, with the exception of 5, who had 20 to 29 sittings. Improvement during the first week—even if slight—is a favorable sign that a cure will be attained finally. The electricity may be applied directly to the sphincter or to the region. All but 20 per cent. of the subjects were improved or cured, and in 16 a complete cure was realized in a maximum of 16 sittings.—*Journal of the American Medical Association*.

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Traité D'Hygiène et de Pathologie du Nourrisson et des Enfants du Premier Age. Publié sous la direction du **Dr. Henri de Rothschild**, Médecin en Chef de la Polyclinique H. de Rothschild, Directeur de la Revue D'Hygiène et de Médecine Infantile. Tome I., avec préface de M. Paul Strauss, Sénateur de la Seine. 800 pp. Price, 15 fr.

In his introduction to this work, M. Strauss dwells upon the gravity of the problem of infantile mortality in France, and the efforts that have been made by legislators there and elsewhere to meet the needs of the situation created by a declining population. These measures include laws regulating the employment of women during pregnancy, guaranteeing them freedom from labor, at least brief periods before and after confinement, etc., and laws dealing with the care of newborn children, especially those coming under the care of the State. The vital importance of breast-feeding is realized and every effort made to secure it. Infants under State care are assigned to wet nurses in the country, and provision made for the medical inspection of both children and nurses.

The book itself consists of seven parts. The first two of these deal with the hygiene of the well infant, and the hygiene and feeding of sick infants. They are the work of de Rothschild and M. Perret. In these parts the all-important subject of infant feeding is dealt with in a much more advanced way than is commonly found in European works. The problems of milk supplies, sterilization of milk, and methods of feeding are discussed at length. The question of wet nursing, and especially its relation to the possibility of syphilitic infection, is discussed exhaustively. These first two parts constitute the most original and valuable parts of the work. They present the results of the work done in the now famous Polyclinic of de Rothschild, where large numbers of infants are kept under observation, their feeding directed, and the results duly observed and recorded. This plan of the systematic medical inspection of all artificially-fed children seems one that should be adopted in all large cities.

In the preparation of the remaining five parts of the book,

which are devoted to rather brief and sketchy descriptions of the diseases of infants and children, de Rothschild has the collaboration of Marcel Deschamps, Roques, Ad. Miele, Fruhinsholz, Kahn, Brunier, Langenberg, Leopold Levi, and Ehrhardt. The brevity of most of the articles in these parts detracts from their value, and nothing unusually valuable is to be found in them. As in most French works one finds sections such as one devoted to "Anomalies of Meckel's Diverticulum" of such scant interest or importance that one wonders why the editor should admit them. As already noted, the value of the book lies in its first two parts, and for them alone it is well worth having. The work is excellently printed in unusually large type, and a number of excellent charts and illustrations.

The Umbilical Cord in Syphilis.—Franceschini (*Gazetta degli Osped. e. Clin.*, February 28, 1904) urges that the umbilical cord of a newly born child be examined histologically when syphilis is suspected in its heredity. This examination is especially useful in newly born infants of unknown origin; in children of parents who have had syphilis many years before; in determining the cause of death in a stillborn child, etc. It is also of value in determining whether an infant with syphilitic heredity should be treated with specific remedies, or whether the mother who has aborted should be so treated. The author thinks that the study of the anatomical changes in the umbilical cord in syphilis will show positive proofs of the laws of Colles and of Profeta, and believes that, even in children who are apparently perfectly healthy, the cord may reveal a latent hereditary syphilis. The cord is the only part of the living child which can be examined histologically. The principal alterations in such syphilitic cords consist in exudative and proliferative changes, in both the artery and vein, including all the coats thereof, together with a certain degree of infiltration, and nodular thickening. In the more advanced cases there are serious lesions in the intima, consisting of endarteritis and endophlebitis, sometimes with obliterations of the vessels. Less frequently periphlebitis and periarteritis are found, and sometimes Wharton's jelly is also affected by an infiltration with multinuclear leucocytes.—*New York and Philadelphia Medical Journal*.

Society Reports.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, March 14, 1905.

JAMES H. MCKEE, M.D., PRESIDENT.

A FAMILY OF FIVE CHILDREN WITH MULTIPLE EXOSTOSES.

DR. ELEANOR C. JONES presented these patients. Five of the eight living children are so afflicted, and the father, who died at the age of forty years, also had numerous exostoses. Joseph, thirteen years old, and Eddie, eight years old, have each about fifty of these growths. The three other children, including a baby of eighteen months, have only from one to three exostoses each. Joseph has also a congenital shortening of the bones of the right forearm.

DR. MILLER said that there is possibly a similarity in these cases of multiple exostoses to those of chondrodystrophy. (He was about to show a patient with this latter disease.) But the similarity may be only apparent. In chondrodystrophy, however, the lesions are symmetrical and bilateral. There is a failure of growth of the cartilage cells of the diaphyses, the periosteum alone producing new bone, and a shortening of the shaft results in consequence. In two of Dr. Jones's patients there is an unilateral shortening of the bones of an upper extremity, with great overgrowth of the bone, and he thought that the two diseases might be allied, especially as the condition in both diseases is congenital.

CHONDRODYSTROPHY FETALIS.

DR. D. J. MILTON MILLER presented this patient, a boy seven and one-third years old. The parents were both healthy and well-formed; no history of maternal impressions, nor of anything bearing upon the causation of the condition could be elicited. Birth had been instrumental, and the large head and small limbs were noted at this time. The boy presented the characteristic features of the disease: normal trunk; large head, with depressed bridge of nose; deformed and shortened extremities; short, fat fingers, of equal length, with characteristic separation of the middle and ring fingers; and marked lordosis. Measurements, compared with those of a normal child of equal age, illustrated in a striking manner, that the dwarfed stature was entirely due to

the diminished size of the lower extremities. Radiographs showing the changes in the cartilage and bones characteristic of the affection were also exhibited.

DR. MILLER said that the etiology of chondrodystrophy is very obscure. There was nothing in the family history of this patient to account for the disease. Two other children are in good health, and the father and mother are well and strong. In chondrodystrophy there is a failure, or irregular growth, of the cartilage cells of the diaphyses; in addition there is a fibrous ingrowth of the "periosteum between the epiphyses and the diaphyses. Growth of the bone is consequently impossible.

STUPOROUS INSANITY AT PUBERTY.

DR. CHARLES W. BURR showed this patient, a boy fourteen years old, who was admitted to the Philadelphia General Hospital in September, 1904. His mother gave the boy a bad name, saying he was profane, a cigarette smoker and stayed out late at night with his father, who is a huckster. In July, 1904, after an attack of constipation lasting two or three days, he began to act strangely. He would take off his clothes at any hour of the day and wander aimlessly about the house. Soon he became sleepless, and would walk up and down stairs all night, giving no reason therefor. Still later, he accused his mother of poisoning him, refused to eat and finally talked only in monosyllables and only when spoken to.

On admission he was well nourished, seemed stubborn and talked little. He said he had pains all over the body. He was very emotional, and cried a great deal. He spat a great deal, and his brows were always contracted. The pupils were widely dilated. The knee jerks were absent. The eye grounds were normal. In the early part of November he became motionless and irresponsive to all stimuli. When pricked deep in the arm or leg he would wince, but showed no other sign of pain. He paid no attention to anything about him, and passed urine and feces in bed. He was mute. For a little while he was slightly cataleptic, and at another time resisted passive movements. He lost flesh rapidly. The temperature had been normal throughout. He would make no effort to chew or swallow food put in his mouth, and was fed by a medicine dropper. On admission the blood was normal, but later the hemoglobin fell to 52 per cent., the number of corpuscles remaining normal. He began to improve on January 3, 1905, when for the first time he swallowed a little milk

willingly. Since then he has slowly become somewhat better. He now talks a little, will willingly chew and swallow soft food, indicates when he wishes to micturate, and obeys simple commands. He has put on a little flesh. Taking him as he now is, it would be difficult to determine whether he is insane or hysterical. With the history, the diagnosis is clear. The mode of onset is characteristic of one of the types of pubertal insanity, or, as it is now fashionable to call it, dementia præcox. Dr. Burr was inclined to believe that the outlook is rather good.

DR. RHEIN asked Dr. Burr why he had not called the condition dementia præcox; and also upon what he had based such a good prognosis. He thought that the symptoms exhibited by Dr. Burr's patient, who at one time complained of delusions of persecution, again of catalepsy, and still later of stupor, warranted a diagnosis of dementia præcox.

DR. BURR said that there was no objection in calling the case dementia præcox, but in his opinion it was preferable to call it pubertal insanity. The term dementia præcox has been made to include so many things that it is fast becoming a very indefinite term. He had given a good prognosis for the reason that the boy has already improved both mentally and physically, and is improving daily.

A CASE OF EXTENSIVE HEART DISEASE, APPARENTLY WITH PERFECT
COMPENSATION.

DR. FREDERICK FRALEY presented the patient, a girl of ten years.

A CASE OF FATAL CHOREA.

DR. J. P. CROZER GRIFFITH reported a case of fatal chorea, in which the death appears to be the direct result of the violent muscular action. The child was unable to speak, and later became delirious and finally comatose. There was a mitral systolic murmur present. Autopsy showed the cardiac lesions of endocarditis, with microorganisms in the muscle and the mitral leaflet.

DR. BURR said that about fifteen years ago he made an autopsy with Dr. Griffith upon a child that had died of chorea. Endocarditis was present, as it has been in almost every, if not every, case of chorea that has come to autopsy. He thought it was impossible to determine whether Dr. Griffith's patient died from the infection or from the violence of the movements.

DR. RHEIN said it was unfortunate that the brain and the

cord had not been obtained in Dr. Griffith's case. The nervous system has been studied microscopically in a few cases of chorea, but nothing very definite has been described. Some observers have looked upon the chorea bodies as being characteristic. Within the last year Dr. Rhein had examined the brains of two children who had died during chorea. A capillary hemorrhage was found in one case, but otherwise the findings were negative. In the second case there was some round cell infiltration in the cortex, and some perivascular dilatation; besides a moderate amount of infiltration of the pia. The blood vessels were numerous and distended, especially in the white matter posterior to the corpus callosum. These cases will be reported in detail later.

DR. ESHNER recalled 2 cases of fatal chorea that he had seen. One was a boy of seventeen years, who came under observation with rheumatic symptoms and who afterwards developed chorea characterized by violent movements. No lesions were found in the brain and cord at autopsy on both macroscopic and microscopic examination. In the second case the cause of death was exhaustion following pericarditis and endocarditis with nephritis. In another case, not fatal, there occurred a series of convulsions, resembling those of uremia or eclampsia, together with high fever. The violence of the movements in cases of chorea like those under consideration would seem to lend support to the view according to which the disease is considered infectious, the secondary intoxication in these instances being especially intense.

DR. MILLER had seen Dr. Griffith's patient at the Children's Hospital. The boy had a very septic appearance, and he thought that some infection apart from the chorea might have been a contributory factor in his death. Ordinarily, cases of severe chorea, even with complications, recover. He mentioned the case of a girl of twelve years who passed through a severe attack of chorea, complicated by pneumonia. She recovered from the chorea, but developed empyema and parotitis and subsequently died.

DR. GRIFFITH thought that the case Dr. Burr referred to was that of a woman who died at St. Agnes' Hospital some years ago. That patient was the only other fatal case of chorea he remembered ever having seen. Her movements were not specially violent, and she died from endocarditis. He thought that the

jactitation of such cases as the one now reported could well be described as terrifying. Although this boy's appearance was septic, no focus could be discovered to account for this condition, and although it is perfectly possible that the death was due to the endocarditis or the septic condition, yet the impression given was certainly that of death from exhaustion, the direct result of the violent muscular action.

NECROTIC STOMATITIS FOLLOWING MEASLES AND PNEUMONIA.

DR. R. MAX GOEPP reported the case of a child eighteen months old who developed, during the course of a bronchopneumonia complicating measles, a necrotic patch at the left angle of the mouth and confined to the inner surface of the cheek. The necrotic area was one and one-half inches long and one-quarter of an inch wide. At this time the child was convalescing. Constitutional symptoms were not marked; the throat was clean. Free cauterization under chloroform anesthesia was performed first with nitric acid, and later the paquelin cautery was applied, supplemented by curettage. Diphtheria organisms were found in both the throat and mouth; the cultures showing in addition staphylococcus albus and streptococcus pyogenes. No bacilli nor higher fungi were observed. No antitoxin was administered. Recovery followed without deformity.

DR. LEVI said that he had seen two patients with Dr. Sailer who had noma following typhoid fever. The Klebs-Löffler bacillus was obtained in pure culture, and although antitoxin was given there was no appreciable benefit from it. One of the children died.

DR. JOPSON said that although he had never obtained the Klebs-Löffler bacillus in the cultures from any of his cases, still he believed there was sufficient evidence at hand to justify the opinion that it is sometimes the cause of this condition. He also thought that the actual cautery or excision is the best treatment in these cases, and antitoxin in doubtful cases.

DR. GRIFFITH agreed that cauterization is the best procedure in these cases. He was not sure that some of these cases diagnosed noma should be classified as such. They represent a condition midway between ulcerative stomatitis and true noma. He considered the term necrotic stomatitis used by Dr. Goepp a very good one for this condition.

DR. HAND referred to an epidemic of necrotic stomatitis that occurred at the Children's Hospital during his residency. The epidemic followed measles and whooping-cough and was much worse than ulcerative stomatitis, but not with the characteristics of true noma, although cauterization was necessary in some of the patients; one case resulted fatally, the infant having had a hemiplegia following whooping-cough.

A CASE OF MALIGNANT SCARLET FEVER.

DR. GOEPP also reported this case. The patient was a girl four and one-half years old who developed high temperature, a rapid and feeble pulse and convulsions, the condition terminating fatally in forty-eight hours. No rash was present. The diagnosis of malignant scarlet fever was made after the appearance of 2 cases of typical scarlet fever in the same household.

DR. HAND spoke of the rarity of malignant scarlet fever and of its two types, one with a decided rash easily diagnosed, and the other with no rash, the diagnosis resting upon the history of exposure, or, as in the present case, on the occurrence of the disease in other members of the family. In his own experience this is the only instance of malignant scarlet fever, all the other fatal cases, two in number, which he has seen, succumbing to a prolonged septicemia.

Colloidal Oxide of Bismuth in Digestive Disturbances of Infancy. — Colloidal oxide of bismuth is tasteless, readily soluble in water and contains 20 per cent. of metallic bismuth. It is to be preferred to bismutose tannigen and tannalbin, since it can be given in solution and never appears unchanged in the stool. Kinner (*Münch. Med. Woch.*, July 21, 1903) has employed it in a number of cases of gastroenteritis in children, complicated by scrofulosis, rachitis and pneumonia, and speaks of it with quite some enthusiasm. The treatment begins with gastric and rectal lavage, and thin tea or albumin water internally. Then three or four daily doses of 5 c.cm. of a 10 per cent. solution in expressed mother's milk or diluted cow's milk are given. The stools soon become more consistent and grayish-green, and the children will rapidly get over their acute attack and gain in weight. For chronic disturbances, with atrophy and swelling of the mesenteric lymph nodes, the preparation is useless, like most other remedies. Gastric irritation was never observed, even after prolonged use.—*Medical News.*

Current Literature.

MEDICINE.

Buckingham, E. M.: The Communicability of Cerebro-spinal Meningitis. (*Boston Medical and Surgical Journal*, April 20, 1905, p. 461.)

In a short communication the author shows not how the disease is spread but how little danger there is of communicating the disease from patients to nurses or to other patients in the same ward. At the Children's Hospital, in Boston, cases of epidemic cerebrospinal meningitis are not isolated, but are treated in the medical wards along with other cases. Aside from the usual cleanliness and good nursing no precautions are taken with these patients. During eight years up to 1904, there were 110 cases of epidemic cerebrospinal meningitis admitted to the wards. Of these, 16 cases were in the wards at one time. Notwithstanding the mingling of these patients with others in the medical wards, not a single case of epidemic cerebrospinal meningitis originated in the hospital, among either patients or attendants of whatever grade. Buckingham concludes that living in the same room and breathing the same air with patients ill with this disease is not of itself dangerous, and that some other mode of transmission must be sought.

Dunlop, G. H. Melville: Syphilitic Synovitis in Children. (*Edinburgh Medical Journal*, December, 1904, p. 516.)

Many cases are unrecognized, being treated as tuberculous or as subacute rheumatism; and probably many cases of long standing joint disease that resist treatment are specific. In childhood syphilitic arthritis may be the result of either the congenital or, rarely, the acquired disease. Sometimes an acute synovitis precedes the eruption in congenital syphilis; again, the synovitis may arise from a gumma in or near the joint. Clinically, however, the joint affections of childhood due to syphilis may be classed as (1) synovitis in infants subsequent to an epiphysitis; and (2) chronic effusion in one or more joints, especially the knees, between eight and fifteen years; in these cases the synovitis is primary.

Syphilitic epiphysitis appears during the first three months of life, and affects chiefly the elbows, wrists, knees and ankles; the arms are more frequently attacked than the legs, and the distal joints rather than the proximal. When not progressing favorably

there is separation of the epiphysis, and perhaps further degeneration; then suppuration due to pyogenic infection, and finally rupture into the joint.

The symptoms of true chronic syphilitic synovitis are characteristic. Striking features of the affection are its insidious development, symmetrical distribution, chronic course, freedom from pain and mobility on passive manipulation, its association with other specific stigmata, its amenability to treatment, and its tendency to relapse. Usually occurring between eight and fifteen years, it may appear as early as three and one-half years, and as late as nineteen years. The knees are most frequently involved. There may be neuralgic pains at night, but there is no disturbance of function, notwithstanding the slight stiffness and the large amount of swelling.

Treatment by ordinary methods for synovitis has little effect; improvement is rapid when mixed mercury and iodid treatment is employed.

PATHOLOGY.

Wollstein, Martha: The Bacteriology of Broncho and Lobular Pneumonia in Infancy. (*Journal of Experimental Medicine*, February, 1905, p. 391.)

For several years a study of the bacteriology of pneumonia has been carried on at the Babies' Hospital, in New York, with a view not only to note the relationship between the variety of bacteria and the extent of the lesion, but also the differences, if any, between the germs found in primary and in secondary infections.

The technique is important, the method being to remove the sternum with a sterile knife, draw out the lungs with sterile forceps, expose the consolidated areas and incise them, a different sterile knife being used for each cut. Then the sterile platform loop was plunged into the incision and agar slants inoculated, as well as cover smears made. Further cultural study and animal inoculation was made, and the lungs were examined, microscopically, in all cases.

One hundred cases were studied, ranging from 18 days to 42 months of age; there were 56 males and 44 females. There were 33 cases of primary bronchopneumonia; of the 67 cases of secondary disease 20 followed prolonged malnutrition, 3 complicated enterocolitis, 5 diphtheria, 3 measles, 2 meningitis, 1

cerebral abscess, 2 malaria, 6 septicemia, and 25 tuberculosis, either pulmonary or general miliary. The pneumococcus was present in 67 cases—25 primary and 42 secondary; it was found in pure culture in 42 per cent. of the primary cases, but alone in only 15 per cent. of the secondary pneumonias. A table gives the associated germs, most important among which are the streptococcus, staphylococcus aureus and albus, diphtheria bacillus, tubercle bacillus, bacillus pyocyaneus and coli communis. Inasmuch as the influenza bacillus was not looked for as a routine practice, it may have been overlooked in certain cases. In two instances that came to autopsy with a diagnosis of influenza cultures for the germ were negative.

HYGIENE AND THERAPEUTICS.

Churchill, Frank Spooner: Observations on Infant Feeding.
(*Journal of the American Medical Association*, May 27, 1905.)

According to Churchill the unsatisfactory results of substitute feeding are due largely if not wholly to certain types of indigestion, either singly or in combination. He follows the usual division into those cases that have most difficulty in digesting (1) cow's milk fat, (2) sugar, and (3) cow's milk proteids. The typical symptoms of each sort of indigestion are given. The commonest form of indigestion is that of the proteids, in which there are colic, foul stools containing curds and mucus, together with anemia and failure to gain in weight. Fat indigestion is more common than usually supposed; its early symptoms are vomiting, loss of appetite, and diarrhea, with loose, yellowish-green stools containing an excess of fat. There may later be produced constipation and severe nervous symptoms. Lack of sufficient assimilation of fat results in malnutrition, frequently in rickets. Sugar indigestion is manifested mostly by the excessive production of gas, resulting in wind colic, and the painful passage of gas by stomach and by rectum.

The treatment consists in giving less of the particular substance which is not properly digested. The general method followed of modifying the milk is that of Rotch, whey and whey-milk mixtures containing a low percentage of caseinogen with a high percentage of lactalbumin being especially favored. The increase in the quantity and strength of the food should be made very gradually from a weak combination easily digested to one of suitable strength for a baby of its age. The weight, the stools and the symptoms serve as guides in changing the formula for each individual patient.

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Original Communications.

THE MEDICAL SUPERVISION OF SCHOOLS AND THE PROGRESS OF SCHOOL HYGIENE.*

BY CHARLES GODWIN JENNINGS, M.D.,
Detroit, Mich.

Since we last met Christopher has departed from our councils. As a physician, as member, councilor and president of this Society, his geniality, intense humanity, and sturdy, broadly cultured mind placed him in the front ranks of the pediatricists of this country. His early end has left a place in our professional lives that it is not easy to fill, and we cannot but pause to express our profound sorrow and regret.

In his presidential address last year, my distinguished predecessor, Dr. Caillé, called the attention of the Society to the necessity of broadening the scope of its labors and of taking cognizance of public questions that relate to the hygiene and pathology of childhood. While, as shown by its proceedings, the activities of this Society have been rather closely confined to the investigation of the problems of the pathology and therapeutics of early life as they relate to the individual, its position as the representative association of this continent for the study of pediatrics demands that it should speak with its authority on the broader subjects connected with the hygiene of child life, on which the physical well-being of the race, and even our existence as a nation, depends. •

Following the suggestions of Dr. Caillé the president addressed to each member of the Council, whose duty it is to formulate the work and policy of the Society, a communication asking

* Presidential Address at the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 20, 1905.

for suggestions as to the advisability of an effort to increase the power and usefulness of the Society, and asking for topics for discussion, etc. While some were encouraging, the general tone of the replies was such as to give the impression to the president that the Council was satisfied with the work of the Society in the past and that no radical changes were desirable. I still believe, however, that Dr. Caillé's conception of the field of usefulness of the Society was right, and that future administrations should direct its efforts to the fulfilment of it.

Among other questions considered in his address, Dr. Caillé adverted briefly to the subject of school hygiene and school inspection.

As one of the commissioners of the Department of Health in the city of Detroit, my duties have compelled me to keep informed upon the development and progress of medical inspection of school children. I believe the importance of the subject justifies its further and fuller consideration by the Society, and I, therefore, ask your attention today to:

THE MEDICAL SUPERVISION OF SCHOOLS AND THE PROGRESS OF SCHOOL HYGIENE.

Although Herbert Spencer and some of the ablest thinkers of our time have contested the right of the State to impose its system of culture upon the citizen, it has become a political axiom in the United States and many of the states of Europe that the government is responsible for the education of its citizens. Here and in Europe the common school has become a fact in the development of state socialism. Compulsory education is a settled state policy in the United States.

Forgetful of the importance of character formation, and still more forgetful of physical development in childhood, the attention of the State and of educators has been concentrated upon the small part of child education, the development of the intellectual capacity.

The compulsory removal of all children from the influence of home life and their segregation in school rooms for from five to six hours a day to receive the intellectual training the State demands, imposes upon the State the secondary, but not less important, duty of a medical supervision that shall indicate their mental and physical ability to endure intellectual training, guard their physical and mental well being during school life, and discharge

them physically and morally, as well as intellectually educated, and ready to take up their life work as the fathers and mothers of the next generation.

Medical officers of health and physicians in private work meeting as they do the disasters to child life that come from enforced exposure in schools to infectious disease, from the unsanitary environment of crowded schoolrooms, and from the increased stress of life involved in the concentration of nervous effort at school work, are agreed that the time has come when children during school life should be protected from these dangers by adequate medical supervision. Before this Society of physicians, familiar with the etiology of acute and chronic diseases of childhood, it is unnecessary to mention in detail the pathologic conditions directly and indirectly traceable to school life. It is equally unnecessary to emphasize the fact that the medical supervision of school children can be done only by medical men. The detection of the acute and chronic infections, of visual, auditory and other physical imperfections, of mental deficiencies and perversions, call for systematic inspection by skilled physicians.

In this address I wish briefly to bring before you the work that has been accomplished in the interests of a safer and healthier school life, the trend of the work of the present time, and the possibilities of the future.

Naturally, the most conspicuous danger of school life, exposure to the acute infections, was the first object of school inspection. With the attention of educators and parents, health officers and physicians directed to the subject, the necessity of amplification to a complete system of medical supervision of schools was gradually appreciated.

Medical inspection of schools had its beginning in Europe. As early as 1832 in Sweden, State regulation of school work was begun. The first laws relating to school physicians and school inspection were passed in France in 1833. The present system of school inspection in Paris was adopted in 1884. Impelled by the increasing myopia in Germany, Cohn, in 1864, inaugurated school inspection by the examination of the eyes of over 10,000 school children. Russia has appointed a physician to each secondary school since 1871. Belgium followed in 1874. In some cities or districts of most of the states of Europe, in Japan and in Egypt, medical inspection of some character has been begun.

Dr. Paul Schubert, of Nuremberg, in a recent monograph,

"Das Schularzt wesen in Deutschland," has treated the subject of the school physician in Germany in a most exhaustive manner, and clearly sets forth excellencies and defects of the German system.

With characteristic seriousness and fully realizing the international importance of the subject, the German Union for School Hygiene, under the presidency of Professor Dr. Griesbach, called the First International Congress of School Hygiene, which convened at Nuremberg, April 4 to 9, 1904. The Congress met under royal patronage, and with the support of the various societies of Europe directly interested in the subject. The United States and Canada were represented by an organization of a president and twenty-six members, several of whom were present in person. The transactions are published in four large volumes and is a remarkable series of papers and discussions, covering the whole field of school hygiene. Upon invitation of Sir Lauder Brunton, representing the Royal Sanitary Institute of Great Britain, the Second Congress will be held in London in August, 1907. The influence of this Congress has been of inestimable value in collecting and rapidly disseminating the facts and theories of school hygiene.

"In England the system has so far spread that already there is a Society of Medical Officers for Schools; the larger school boards provide for medical attendance and their teachers and pupil teachers, for the regular visiting of their schools, for the dovetailing of medical school inspections with the regular work of the public health organizations, and, generally, for the discovery of infection among school children and the prevention of infection by detailed periodic examinations of school premises. In many public schools, more especially where a boarding system is in force, medical inspection has gone much further. Such schools retain the services of a medical officer, whose duty it is to examine all pupils admitted, to ascertain their fitness both for the mental work of the school and for the physical training required, to attend any cases of illness that may arise, to arrange for the isolation of infectious diseases either within premises provided by the school or in the hospitals of the local authorities, and to report, from time to time, to the governors, any circumstances that may imperil the hygienic safety of the children. In the industrial schools, too, which are under the control of the Home Office, the managers appoint a medical officer whose duty it is to attend any cases of sickness, and to exercise a general supervision over the health of the school children. In many other schools, even where medical practitioners are not re-

tained, it has become the custom systematically to measure, weigh, and examine all the pupils admitted, and, from time to time, all pupils in attendance." (Mackenzie.)

The works of Carpenter and Arthur Newsholme, the textbook of Mackenzie, the writings of Kerr, Clement Dukes, Chisholm, Lauder Brunton, and numerous physicians, educators and philanthropists, and, above all, the Conference on School Hygiene, organized by the Royal Institute of Hygiene in February of this year, reveal the fact that the people of Great Britain are fully alive to the national importance of this question.

Medical inspection of schools in the United States has been slow of adoption and limited in its application. The diffusion of authority in municipal government, the occasional unfortunate introduction of partisan politics into educational administration, the democratic reluctance to the endurance of paternal measures of restraint, all have had their influence to delay the general adoption of medical supervision of school children. Again, only in the last few years has the density of urban population increased to the extent that the necessity of medical control of the aggregations of children in the common schools became apparent.

Boston introduced the first system of medical inspection of schools in 1894. New York followed in 1897. To assure themselves of the value and necessity of a system of inspection, the boards of health of New York and Boston conducted a series of preliminary investigations. To the members of this Society familiar with the modes of transmission of the infectious diseases, it is unnecessary to detail these investigations. They were made to assure administrative and legislative bodies and to demonstrate to them facts of common medical knowledge.

Chicago, Philadelphia, St. Louis, Washington, Detroit, and many of the smaller cities of the United States, have followed the lead of Boston and have adopted systems of medical school inspection.

With some exceptions, medical inspections of schools in the United States has had for its object only the detection and exclusion of the infectious diseases. It has been a measure originated and carried on by boards of health for the prevention of the spread of the contagious diseases of childhood, and until boards of education have adjusted themselves to this new duty, it will remain a department of health administration.

In all probability the medical inspection of schools should be

under the control of the Board of Education. It should be a department of the school system and only related to the Board of Health, as the two bodies may be of mutual benefit in performing their respective functions.

Whenever in the United States medical school inspection has been established, health officers have been quickly and fully convinced of its value in protecting the health and lives of children and in diffusing a knowledge of the principles and practice of preventive medicine. The value to a community of a system that has for its object only the exclusion of pupils suffering from contagious diseases is well illustrated by the records of the Department of Health of Detroit. From the beginning of the school year in September, 1904, to June 1, 1905, there were examined by the medical inspectors 24,096 pupils. Of these, 1,678 were found to be suffering from the various communicable diseases, as follows:

Scarlet fever.....	17
Diphtheria	21
Measles	4
Mumps	28
Varicella	91
Roetheln	1
Pertussis	4
Tonsilitis	570
Contagious skin diseases and miscellaneous diseases	942

Reports from other cities show similar results. Regardless of such evidence that should be convincing, and like all measures for the protection of the community at the inconvenience of the individual, the medical inspection of schools has met with abundant opposition, and sometimes from unexpected quarters. A very recent editorial in a conservative and influential daily paper of Detroit well illustrates the need of public education in the value of preventive medicine. Speaking of the medical inspection of schools, this writer said: "It cost the taxpayer last year \$2,500 for this perfectly useless service, a service that would be ridiculous were it not an abominable and intolerable piece of impertinence." It is almost pathetic to contemplate the state of mind of one who can designate as impertinent the protection by a department of health of hundreds of children from exposure to

dangerous contagious diseases. It is gratifying to note, however, that with only an occasional exception medical school inspection has been received with approbation by boards of education, teachers and intelligent citizens.

Up to the present, the medical supervision of schools has not been considered seriously in the United States by national bodies. The United States Bureau of Education has published in the reports of 1898 and 1902 chapters reviewing the progress of medical inspection of schools in this country and abroad. In educational bodies, desultory discussions have arisen from time to time, and in 1898, at the meeting of the Department of Superintendence at Chattanooga, a Committee on School Hygiene was appointed, with the United States Commissioner of Education, W. T. Harris, as chairman. This committee made a preliminary report the following year, giving the deplorable conditions existing in the public schools of this country and calling for the enlightenment of school boards, teachers and others regarding the subjects of school hygiene and sanitation. Although the report of this committee revealed the urgent need for an organized movement for the improvement of school sanitation and hygiene, no action was taken on the recommendation included in it.

The Section of Nervous and Mental Diseases of the American Medical Association, at the session of 1903, appointed a committee to inquire into the relation of school methods to school diseases. The members of the committee, Dr. W. J. Herdman and Dr. James H. McBride, reported to the Section at the session of 1904, and their report is published in the *Journal of the American Medical Association*, April 15, 1905. The report embodies a brief review of the progress of medical inspection, with comments, and this conclusion:

"In the opinion of your committee, the American Medical Association should place itself on record as advocating and urging the inauguration of a thorough and systematic medical inspection of the public schools and school children in every section of this country:

"1. In the interests of public health, since it is a potent means for detecting and preventing the spread of contagious and infectious diseases.

"2. For the purpose of securing to the child, while in attendance on school, the most favorable hygienic and sanitary conditions.

"3. For the purpose of getting exact knowledge regarding the physical and mental capacities of each child, in order that the methods of instruction may be intelligently directed to meet the individual needs.

"Thus far, it would seem we can safely go in support of what the most enlightened and progressive educators are seeking to accomplish, and in this effort they should receive from this national organization hearty endorsement and assistance, as they have in many localities from its individual members."

The American Academy of Medicine has appointed a committee to investigate the teaching of hygiene in the public schools. Papers have been presented and the Academy is earnestly endeavoring to advance the progress of a reform movement.

Thus, it will be seen that the beginnings of a medical supervision of school life have brought to medical men and others a realization of its importance in the physical development of the race. Although at the present time efforts are confined almost exclusively to the discovery and exclusion of infectious diseases, a start has been made toward the development of a complete system of physical inspection. Chicago is studying the physiology and pathology of the school child. New York is beginning an investigation into the physical and mental condition of school children that is revealing a state of physical imperfection that would be startling were physicians not already too familiar with it. Of 7,166 boys recently examined by the medical inspector, 3,132 were found in need of medical attention; 650 of these showed defective mental development. The future will undoubtedly see the elaboration of medical school supervision until the whole period of school life is subject to a watchful care that will ensure education in its highest sense—the development of the entire mental, moral and physical faculties of childhood and youth.

PHYSICAL EDUCATION.—"The universal essential of growth is exercise. A harmonious training according to the entire nature is the condition of effective manhood. The development of mind is largely dependent upon efficiency of body; and the expansion of the moral element, so well expressed by the word character, is similarly intertwined: neglect of part is derangement of the whole.

"The character of a nation, as of an individual, is mainly dependent upon the completeness of the mental and moral education of its young; while the vigor and enterprise of a nation are based upon their physical training during the period of growth.

No education is of permanent value which sacrifices health at its altar.

"The school motto must ever be, 'The greatest health of the greatest number.' The most sensitive test of a system, a school, or even a neighborhood, is the health, disease, and death-rate of the young whom it nurtures. To enable them to attain a bare existence is a grave neglect of social duty; to ensure their thriving is our bounden obligation. It is mainly during the years of school life, when its material is plastic, that a sound constitution can be produced, and a tendency to hereditary disease eradicated." (Dukes.)

In Great Britain, the startling announcement of the committee on the physical deterioration of the nation has been promptly followed by extensive inquiries into the physical conditions of school children in London, Edinburgh, Aberdeen, Glasgow and Dundee. With its less crowded population, this question has not yet become an urgent one in the United States, but the rapidly increasing urban population has brought emphatically to the minds of physicians that the time is soon coming when the questions of physical deterioration will here press for consideration as it now does in Europe.

From the conclusions of Clement Dukes in a paper read before the First International Congress of School Hygiene on "The Organization of Physical Education in Schools," I take the liberty of quoting: "The exercise of the physical faculties of children is as important for their well-being as mental and moral education. The development of these faculties is possible only during childhood."

"The physique of the next generation depends upon the physical education of the present, and physical education requires a similar organization to that of mental education.

"While the question of physical training is important enough in the case of boys, it is of equal or greater importance in the education of girls. In boys, the demand for exercise is spontaneous and irrepressible. Custom and false conceptions of physical grace hamper the whole childhood and youth of our women."

The serious defect in schools for girls is the inadequate provision for physical education. Women should be strong, vigorous and healthy, yet no effort is made during the period of their active growth and development to make them so. Education of

growing girls should not be at the expense of motherhood; we do not want crammed heads on undeveloped bodies.

"If girls are to receive a higher culture, it is their physical education which must precede any increase in their mental education. Without this the process cannot be safely effected; for the mental powers, too highly developed in women, involve a physiological cost which her feminine organization will not sustain without injury more or less profound."

WORK AND SLEEP.—Knowledge of the physiology of childhood emphatically reveals how seriously inadequate is the provision for brain rest in the whole scheme of school education. No attempt is made to adjust work and sleep to the physiological demands of the young, growing child. The work demanded of children in all grades is excessive, and this with the coincident deprivation of exercise, play, rest and sleep, is accountable for the illy-defined pathological conditions which medical men continually meet in childhood.

Clement Dukes has tabulated the hours of work and sleep requisite during youth and childhood, which is, in part, as follows:

THE HOURS OF WORK AND SLEEP ADAPTED TO THE VARIOUS AGES OF CHILDREN.

Ages of Pupils.	Hours of Work per Day.	Hours of Sleep per Night.
From 5 to 6 years.....	1	13½
" 6 " 7 "	1½	13
" 7 " 8 "	2	12½
" 8 " 9 "	2½	12
" 9 " 10 "	3	11½
" 10 " 12 "	4	11
" 12 " 14 "	5	10½
" 14 " 16 "	6	10
" 16 " 18 "	7	9½
" 18 " 19 "	8	9

As examples of the excessive work demanded in the school life of to-day, I will cite 3 cases recently seen, all suffering seriously from the physical effects of brain fag.

Case 1.—A daughter of wealthy parents in a private school for girls. School hours, 8:30 o'clock to 12:30 o'clock. Continu-

ous study or recitation, with ten minutes' recess at 11 o'clock. Luncheon, 12:45 o'clock. German lesson and study, 1:15 o'clock to 2:30 o'clock. Play, from 2:30 o'clock to 4 o'clock. French or music, 4 o'clock to 5 o'clock. A total of six hours per day of school work.

Case 2.—A daughter of wealthy parents in a private school. The girl rose at 6 o'clock. Some hurried study, with breakfast at 7 o'clock. At school, from 8:30 o'clock to 12:30 o'clock, with fifteen minutes' recess at 11 o'clock. Luncheon at 1 o'clock. Music and recitation, 1:30 o'clock to 3:30 o'clock. Out until 6 o'clock. Dinner, 6:30 o'clock. Study, 7 o'clock to 10 o'clock. A total of nine hours of work, one and one-half hours out of doors and eight hours of sleep.

Case 3.—A girl of seventeen years in the high school studying for a teacher's position. The girl rose at 6:30 o'clock. Breakfast at 7:30 o'clock, followed by hurried study. In school, from 8:30 o'clock to 1:15 o'clock, with fifteen minutes' recess for lunch. An indigestible lunch was often taken at recess. Dinner at 2 o'clock. Study, from 3 o'clock to 6 o'clock. Supper at 6 o'clock. Study, from 7 o'clock to 11 or 12 o'clock. A total of ten hours' study, six to seven hours' sleep and no recreation.

Food.—Ignorance of the simplest facts of dietetics in homes and in boarding-schools is responsible for many of the pathologic conditions of childhood. In addition to excessive work and long confinement, with deficient rest and sleep, is a dietary improperly selected, badly prepared and often inadequate to the demands of the growing child for nutrition.

These are but suggestions of the problems that demand correction in school life. How correction is to be made is a question for the earnest thought and united efforts of physicians, educators and parents. There are difficulties to be overcome that now seem insurmountable, but which with an aroused public sentiment may fade away. With a thorough medical supervision of the school system by a medical department of the Board of Education, with the school developed into a laboratory, where teaching of hygiene is made practical by a perfect sanitary environment, will come a diffusion of a knowledge of the necessities of healthful living that will make reform a natural process of development.

A broad-minded educator (Henderson, "Education and the Larger Life"), writing of the difficulties to be overcome in making over our primary schools, says:

"But the major difficulty, the one which may not in kindness be ignored, the one which prevents the humanizing of the lower schools, and vetoes many a wholesome, red-blooded experiment in education, is really this—when these children of good fortune, for such I must regard them, come, at fifteen years of age, to the door of the high school, they find it closed. They are not wanted. They do not know parsing and grammar and spelling and arithmetic and political geography and physical geography and history and civil government and physiology. They are simply strong and well, clear-eyed and accomplished, inquisitive and earnest, full of power and promise. Comparing the two groups of utilities, the high school chooses the former. But often, it chooses with a sigh. What, then, is the excuse? It is the same excuse all along the line. The lower schools would be good if the high schools would let them, and the high schools would be good if the colleges would let them, and the colleges would teach the knowledge of most worth if the community would let them. Apparently, it is a superior madness which drives us."

It may not be the province of this Society to introduce reforms in school hygiene or other departments of national sanitation. The objects and methods of its organization preclude this. It may and should be ready, however, with its exceptional knowledge of child pathology, to unite with national educational bodies, boards of health, and similar public organizations, in movements directed to the improvement in the physical development and well-being of the children of the nation. To this end a standing committee could be appointed with power to represent the Society in national conferences and international congresses for the study of school hygiene. Such a committee would be the medium through which the special medical knowledge of the Society could be made available in the guidance of reform movements, and through it the Society kept informed of the development and progress of school hygiene.

Until the American Pediatric Society thus gives its aid to such problems of national development, it will have but partially fulfilled its duty to scientific medicine, and the welfare of the children of the nation.

IMPORTANT DIFFERENTIAL POINTS IN THE DIAGNOSIS OF SPORADIC CRETINISM, MONGOLISM, ACHONDROPLASIA AND RACHITIS.*

BY CHARLES HERRMAN, M.D.,
New York.

At first sight it may seem remarkable that conditions so widely different in their pathology should offer difficulties in the way of differential diagnosis, and yet such is sometimes the case. To cite a few examples:—

About fifty years ago Virchow diagnosed a case as one of cretinism, which afterward, on more careful investigation, proved to be one of chondrodystrophy. It was this case which gave rise to the erroneous belief that a premature synostosis of the sphenoid and occipital bones at the base of the skull was characteristic of cretinism.

In the discussion following the report of a case of fetal chondrodystrophy by Morse, at the American Pediatric Society, in 1902, Jacobi said that the diagnosis was doubtful; and that the case might very well be one of rachitis.

The difficulties in the differentiation of cases of sporadic cretinism and mongolism are best illustrated by the fact that some very eminent English authorities still consider mongolism as a form of sporadic cretinism.

These questions of differential diagnosis are not only of scientific interest, but also of great practical importance, for upon the correct diagnosis depends the prognosis and treatment which is entirely different in each of these affections.

All of these conditions, sporadic cretinism, mongolism, achondroplasia and rachitis have certain features in common, though clinically and pathologically they are widely different. We have here a striking illustration of how different causes acting in different ways may produce similar results. Examples will be noted later.

I shall consider primarily the clinical aspect of the subject as

* Read before the Section on Pediatrics of the New York Academy of Medicine, April 12, 1905.

being of more practical importance, and shall, for the sake of clearness, disregard the exceptional, atypical cases, which show unusual features, and consider the vast majority which present a characteristic picture.

In the diagnosis of these conditions the personal equation plays an important part. Anyone who has had an opportunity of seeing a number of cases will often be able to make the diagnosis at a glance. Here it is eminently true that "to know is to recognize." On this account the demonstration of photographs of typical cases is of great value, replacing, to some extent, the personal observation.

It will be well to begin by clearly defining the terms used. A number of different conditions have been grouped under the head of fetal rickets. The term should be dropped or applied solely to those very rare cases in which the rachitic process develops in utero and ceases before birth. The rachitis here considered is the ordinary form so frequently seen in infants and children.

Under cretinism only the sporadic cretinism, or infantile myxedema, is considered.

By mongolism we understand that form of congenital idiocy of unknown origin, in which the patients present the Mongolian slant of the eyes.

Under achondroplasia, or fetal chondrodystrophy, we shall consider the condition as it occurs in infants and children.

It would be well if the term "cretinoid" were dropped. If it must be used we should speak of the "cretinoid" type of features, *i.e.*, the depressed bridge of the nose, open mouth, with protruding tongue, etc. It is this type of features which serves as a connecting link for the cases of sporadic cretinism, mongolism and achondroplasia, and gives a certain amount of family resemblance to the different members of each group. The reason that all the cases of one group resemble each other is that certain features are so accentuated and caricatured, that the finer differences are lost. In sporadic cretinism it is the depressed bridge of the nose, the puffy eyelids, thick lips, prognathous jaw and his idiotic expression given by the open mouth and large, protruding tongue. (Fig. 4.) In mongolism the peculiar slant of the eyes. (Fig. 5.) In achondroplasia the marked disproportion between the head, trunk and extremities. (Fig. 2.)

The peculiarities in the features are not always produced in the same way, though the result is similar. We are indebted to

Kaufmann for a better understanding of the different ways in which they may occur. (Fig. 1.)

The development of the nasal and superior maxillary parts is dependent upon the growth at the base of the skull. When there is a premature synostosis of the tribasilar bone or a lack of

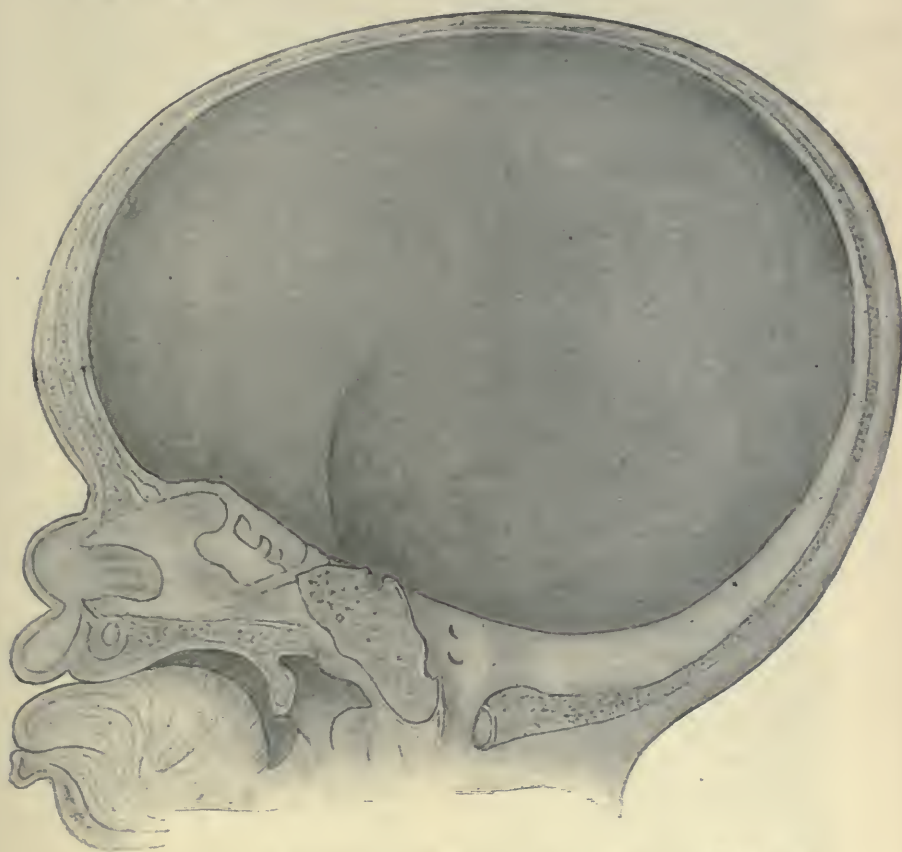


FIG. 1.—SECTION THROUGH THE SKULL OF A CASE OF CHONDRODYS-
TROPHY (ACHONDROPLASIA). NATURAL SIZE. (KAUFMANN.)

growth of the cartilaginous structures between these bones, the nasal and superior maxillary parts are not pushed forward sufficiently, so that a depressed nasal bridge results.

But this may also occur as the result of insufficient growth of the cartilaginous structures anterior to the tribasilar bones, without any change in the normal development of the bony or cartilaginous structures at the base of the skull.

In chondrodystrophy either of these conditions may be present, more frequently a premature speno-occipital synostosis.

In sporadic cretinism there is usually an insufficient growth at the base of the skull, not a premature synostosis, as was formerly supposed.

In mongolism there is probably primarily an arrest of development of the structures at the base of the brain, followed by a premature synostosis at the base of the skull.

The high-arched palate and epicanthus, so frequently associated with the depressed nasal bridge, are also probably the result of the changes above described.

Mongolism and chondrodystrophy are always congenital conditions. Sporadic cretinism, often congenital; rachitis, rarely. In mongolism and chondrodystrophy the characteristic features are always evident at birth. Sporadic cretinism is very often a congenital disease in so far as the thyroid gland is abnormal and its secretion defective from birth. The symptoms are usually not immediately apparent for two reasons: First, if the infant is at the breast it receives with the mother's milk substances which take the place of those lacking in its own thyroid secretion. Second, possibly some of the other ductless glands, notably the thymus, may act vicariously.

In all of these conditions the patients are undersized, dwarfed. (This is most marked in the cases of cretinism and achondroplasia.) In all there is a dystrophy, a deviation from the normal growth at the junction of the epiphysis and diaphysis. However, in each the pathologic changes are different, though they produce a similar result. They differ also in the location of this lack of growth.

In rachitis and mongolism all the parts are nearly uniformly affected so that the result is more or less proportionate dwarfism. In sporadic cretinism the extremities are somewhat more affected (Fig. 4), while in chondrodystrophy the extremities are almost exclusively affected, the growth of the head and trunk remaining nearly normal. (Fig. 2.)

This causes a change of centre of the body.

The mid point between the vertex and sole, instead of being at or below the umbilicus, is displaced upward to the ziphoid cartilage.



FIG. 2.—CHONDRODYSTROPHY (ACHONDROPLASIA). 17 YEARS.

Anterior view, showing depressed root of nose, short extremities, peculiar articulation at the knee, and well-developed genitals.

Posterior view, showing large head, low shoulders, normal size of trunk, short scapulæ, lordosis in the lower lumbar region, and muscular legs.

The hands, instead of reaching to middle of the thigh, barely touch the trochanters.

All these children begin to walk late; in all there is a lack of muscular tone, and in mongolism and in cretinism (untreated) a lack of power of co-ordination.

In cretinism, mongolism and rachitis there may be anemia. The cases of mongolism, notwithstanding a diminution in the percentage of hemoglobin, often have peculiar pink patches on the cheeks and chin as if "rouged."

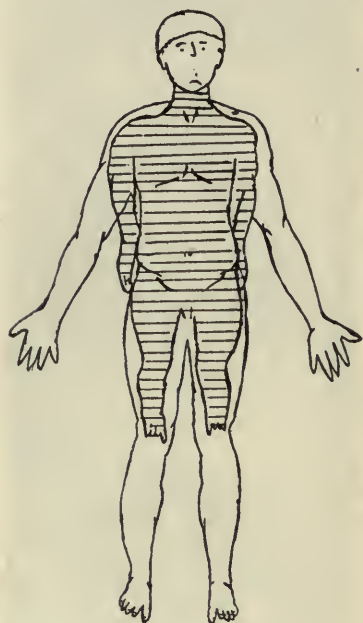


FIG. 3.—OUTLINE OF A CASE OF ACHONDROPLASIA AS COMPARED WITH THAT OF NORMAL BOY OF SAME AGE (15 YEARS).

The anemia of cretinism has often a yellowish or greenish hue, with a marked reduction in the percentage of hemoglobin, and occasionally nucleated red blood cells.

In one case examined by Langhans, changes were found in the bone marrow, which in future may serve to throw some light on the anemia of this disease. The condition of the blood improves immediately under thyroid treatment.

In rachitis we may have all grades, from the mildest to the most severe forms, of secondary, or so-called Von Jaksch anemia.

A marked, persistent subnormal temperature, which reacts immediately to thyroid treatment, is characteristic of sporadic cretinism. I have repeatedly seen a rise of a degree or a degree and a half within forty-eight hours following the small initial dose of one-half a grain twice a day. This offers the easiest and most accurate method of regulating the thyroid dosage. Begin with small doses gradually increased until the temperature is normal, and determine what amount is necessary to keep it at that point. These patients untreated are cold and cyanotic, and if old enough to speak complain of feeling chilly. The pulse is slow. There is

a defective heat production, and heat radiation, associated with a sluggishness and torpidity of all the vital processes.

In mongolism the temperature is sometimes subnormal, but this is never so marked and persistent as in cretinism. Uncomplicated cases of rachitis and chondrodystrophy have a normal temperature.



FIG. 4.—A. G. SPORADIC CRETINISM.
1 year. Before treatment.

The *skin* in cretinism as against mongolism often presents a characteristic myxedematous infiltration. Occasionally around the chest and in the supraclavicular region, fatty pads. In only 2 cases which I have seen were these pronounced.

In the cases of infantile myxedema and chondrodystrophy there is often a *redundancy of the tissues* about the legs, causing thick folds in the skin, which seems too large for the bones within.

The Head.—In all these conditions there is a delayed closure of the fontanels.

In rachitis the head is large and square, with prominent frontal and parietal bosses, often craniotabes.

In mongolism the head is brachycephalic. The anteroposterior and lateral diameters are nearly equal. The occiput is flattened and there is frequently a hollowing at the temples. Not only the anterior, but the posterior and lateral fontanels, as well as the sutures, remain open much longer than normal.

In cretinism the head is small, but presents nothing charac-

teristic. The hair as against mongolism is coarse, dry and scanty.

In chondrodystrophy the head is relatively large. (Fig. 2.)

The Face.—We have already referred to the depressed bridge of the nose, epicanthic fold, and the increased distance between the eyes, as common to cretinism, mongolism and chondrodystrophy.

In cretinism there is, in addition, the puffy eyelids, the scanty

eyebrows, low forehead, thick lips, prognathus jaw and open mouth with large, protruding tongue. (Fig. 4.)

In mongolism the slant downward and inward of the palpebral fissure often associated with strabismus or nystagmus. (Fig. 5.)

Adenoid vegetations are frequently present in the pharynx and the obstructive symptoms are more marked on



FIG. 5.—P. MC. MONGOLIAN IMBECILITY.
2 years, 10 months.

account of the depressed nasal bridge and high-arched palate.

The peculiar *nasal* voice and cry of cretins may be due to a myxedematous infiltration of the nasal and laryngeal mucous membranes.

The *nose* in chondrodystrophy differs from that of cretinism and mongolism in that the end is bulbous.

The *tongue* in cretinism is increased in size by a myxedematous infiltration, which disappears under thyroid treatment. It protrudes partly because the mouth is open, as in all forms of imbecility, partly because it is actually too large for the mouth.

In mongolism the tongue is not enlarged. On the dorsum the fungiform papillæ are increased in size, and at a later period the tongue is often fissured.

In the fetal cases of chondrodystrophy, there may be a genuine hyperplasia of the muscular tissue of the tongue.

The *high-arched* palate is especially frequent and marked in mongolism.

The *teeth* appear late in all, but especially so in cretinism. In them there is also a tendency to early decay.

In cretinism, on palpation the rings of the trachea can be distinctly felt; the *thyroid gland* is atrophied or absent. However, even the normal thyroid is difficult to palpate, and the determination of its presence or absence by this method uncertain.

In rachitis the *chest* shows characteristic changes: The rosary dūē to an increased growth of the cartilage at its junction with the osseous portion of the rib, a prominent sternum and Harrison's groove.

In chondrodystrophy there may be beading of the ribs, but it is due either to periosteal overgrowth, the osseous portion of the rib forming a cup-like mass around the cartilaginous end, or to a forward displacement of the cartilage or bone due to the periosteal intrusion. Otherwise the chest is well formed and of normal dimensions, in striking contrast to the short extremities.

(A distended, protruding abdomen is common to cretinism, mongolism and rachitis, and is often associated with an umbilical hernia.)

Curvature of the spine, kyphosis or kyphoscoliosis, due to muscular weakness, with or without softening of the cartilages, is present in rachitis and cretinism.

In chondrodystrophy there is usually a marked lordosis in the lumbar region, with a tilting upward and backward of the sacrum. (Fig. 2.)

In all these conditions the *extremities*, especially the lower, are shorter than the normal. This is especially marked in the cases of chondrodystrophy. The proximal portion is chiefly involved. The bones are short and thick, sometimes the epiphyses are enlarged by an increased periosteal growth.

The tubercles for the attachment of muscles are prominent. The shaft of the long bones is rarely bent, the apparent bowing being due to changes in the articulation of the joint.

If there is any *curvature* of the shaft, it is not due to softening, but to the periosteal intrusions at the epiphyses, which offer resistance to the growth in length of the diaphyses. (Fig. 6.)

In rachitis the enlarged epiphyses are due to an abnormal development of the epiphyseal cartilages. There is a genuine curvature in the shaft due to softening and traction.

Bending of the shaft of the long bones takes place occasionally in cases of cretinism in which the thyroid treatment has been pushed, probably as the result of softening of the cartilages.

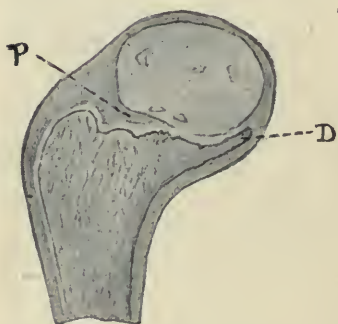


FIG. 6.—CHONDRODYSTROPHY (ACHONDROPLASIA). (KAUFMANN).

Section through the lower end of the femur.

P=Periosteal intrusion.

D=Diaphysis projecting over the epiphysis.

In all, but especially in the cases of mongolism, the *joints* are extremely *lax*. This may be due to loss of muscular tone, allowing a greater separation of the ends of the bone or to a softening of the cartilages.

The Hand.—In cretinism the hand is flat and spade-like; cold and cyanotic.

The skin has an edematous, wrinkled appearance. The fingers are short and stumpy.

The radiograph (Fig. 7) shows a delay in the appearance of the ossification centres—a most important differential point which will often make clear the diagnosis in a doubtful case, and

serves as an easy and accurate method of following the progress of a case under treatment.

In well-marked cases of rachitis, especially in the second year, the hand is long and narrow, with the thumb flexed. The fingers are long and show a peculiar beaded appearance (Fig. 8), to which Koplik has called attention. These changes, I believe, are due not to a thickening of the shaft, but primarily to a laxity of the muscular tissue, which allows a greater separation of the ends of the bones, and a sagging of the tissues at these points of separation.

In chondrodystrophy the hand is small and square. The fingers are short and of nearly equal length, their ends blunt, with

a tendency for the middle and index to diverge from the ring and little fingers (Fig. 9), giving the so-called "trident" form.

The radiograph shows these features, the short, thick metacarpal bones with large heads, and a normal or premature junction of the epiphyseal ends.

The hand of mongolism approaches more nearly to the nor-

mal. The fingers are well formed and tapering. A frequent, though not, as Telford Smith first thought, characteristic feature is the small second phalanx and bend in the last phalanx of the little finger. (Fig. 10.)

As pointed out by West, this peculiarity is met with in a certain percentage of otherwise normal children. It must be considered as rather a congenital anomaly, analogous to club-foot or congenital heart-disease, anomalies more frequently met with in all forms of congenital idiocy.

In cretinism the genitals are often unusually large, and the skin of the scrotum



FIG. 7.—H. G. SPORADIC CRETINISM.
Age 10½ years. Corresponds to the normal
at 8 years. Under treatment 9 years.

may be thickened. Sexual power is deficient.

An important point which may sometimes assist in differentiating rachitis from cretinism is the fact that the former *sweat* profusely, the latter never.

A persistent, obstinate *constipation* in a breast-fed infant dat-

ing from birth and resisting the ordinary methods of treatment is characteristic of sporadic cretinism. It is probably due to a myxedematous infiltration of the tissues of the intestine, and always disappears, either immediately or after a short time under thyroid treatment. Constipation is present in about 25 per cent. of the cases of mongolism and often in rachitis, but it is never so persistent.

Mentality.—In rachitis the intelligence is retarded only in so far as the children do not go about and mingle with others so early. They are often unusually good-natured.



FIG. 8.—RACHITIC HAND, SHOWING BOWING OF THE FINGERS. (KOPLIK.)

In chondrodystrophy the intelligence is not markedly affected and still, judging from one of my own cases, which I had an opportunity of studying carefully, and from the description of some of those reported by others, I should say that it is not normal. The patients are lively and good-humored. In certain directions their intelligence is very good; in others very poor. Many of them seem to lack what might be called the normal intellectual equilibrium. They remain childish.

It is not likely that this is due entirely to the fact that they are kept from school. One of my patients, although he has been going to school for some years, has made comparatively little prog-

ress. Neither does the fact that they hesitate to mingle with other children on account of the attention which their peculiar appearance attracts account for the condition. It is probably due to changes in the development of the brain.

Cretins untreated are sluggish, apathetic or idiotic. The earlier the treatment is begun the better the chances of an approach to the normal intelligence. This, however, is never reached. In 2 cases (Fig. 11) originally treated by Dr. Koplik, and still under observation, a boy of ten and one-half years, in whom treatment was begun at fifteen months; another, a girl of eight years, under



FIG. 9.—THE HAND IN CHONDRODYSTROPHY (ACHONDROPLASIA).

S. G. Age 17 years.

treatment since four weeks of age, there is still a marked retardation.

In mongolism we may have all grades, from the mildest form of imbecility to complete idiocy. In striking contrast to the untreated cretin, they are usually lively and restless. I have never seen any improvement intellectually under thyroid treatment.

The *prognosis* in uncomplicated rachitis is good both as to physical and mental development. In chondrodystrophy, if they survive birth (many are still-born), they seem to become stronger as they grow older, but remain undersized.

In sporadic cretinism, if treatment is begun early the mental as well as the physical improvement is pronounced. They are less resistant to diseases, especially pulmonary.

Two personal cases died of pneumonia; another died suddenly without apparent cause—very likely it was a case of the “status lymphaticus.” A hyperplasia of the thymus is not infrequently met with in cretinism.

The Mongolian imbeciles are also prone to pulmonary disease, especially tuberculosis. However, not a few reach adult life. The mental condition is always that of an imbecile of a mild or severe type.

Pathology.—In chondrodystrophy there is a change, a per-



FIG. 10.—THE HAND IN MONGOLISM.

H. G. 18 months. Second phalanx of little finger short.
Last phalanx bent.

version of the normal process of endochondral ossification at the junction of the epiphysis and diaphysis, where normally growth takes place. The principal change is in the columnar zone, in which there is a defective formation of rows of cartilage cells. This prevents growth in length. In addition, there is often an increased growth of periosteum, the tissue wedging its way in between the epiphysis and diaphysis from the periphery toward the axis of the bone. This also prevents growth in length.

In rachitis the enlargement of the ends of the bones is due to an abnormal development of the epiphyseal cartilage. In chondrodystrophy to a periosteal overgrowth which forms a cup-like

mass around the end of the cartilage. Microscopically, in rachitis the proliferating zone between bone and cartilage is wider and more vascular.

The bowing of the extremities in rachitis is due to softening of the bone with traction of the muscles. In chondrodystrophy to peculiarities in the articulation of the joint, or to the resistance offered to growth in length by the periosteal intrusion at the junction of epiphysis and diaphysis. In rachitis all the bones of the skull are affected. In chondrodystrophy only those of the base.



FIG. 11.—SPORADIC CRETINISM. THREE CHILDREN OF ONE FAMILY.

H. G.	August, 1902.	8 years.	Under treatment 7 years.
S. G.	" "	6 years.	Under treatment 5 years, 11 months.
B. G.	" "	2½ years.	Under treatment 2 years, 4 months.

First 2 cases were reported by Dr. Koplik in September, 1897.

In sporadic cretinism there is an absence, atrophy or sclerosis of the thyroid gland. There is a delay in the appearance of the ossification centres, and a retardation in the transformation of cartilage into bone at the epiphysis, not a premature synostosis.

The treatment with thyroid extract is specific only in the cases of sporadic cretinism.

The other conditions may be somewhat improved by this medication, but its action is not specific.

In such conditions as mongolism and rachitis which cause

changes in almost every tissue of the body, we should naturally expect that the function of the ductless glands would also be affected. It is therefore not surprising that beneficial effects are sometimes obtained by the administration of extracts of these glands. Thus, in some cases of rachitis, Heubner obtained good results with the thyroid extract, Mendel with the thymus extract, and Stoeltzner with the suprarenal extract. Hence, also, the advantage of giving in certain cases a combination of two or more extracts as advised by Jacobi. In each case the deficiency of the corresponding gland is supplied. But because in a given set of cases of rachitis some improvement follows the administration of suprarenal extract, we are not to conclude that rachitis is due solely to a lesion of the suprarenal bodies.

In the same manner, because in some cases of mongolism the thyroid treatment has a beneficial effect on the constipation and umbilical hernia, we are not justified in concluding that mongolism is due to a lesion of the thyroid, and is therefore a form of cretinism. In sporadic cretinism the thyroid extract has a specific action, causing marked changes in the entire economy, the temperature rises to the normal, the bowels move regularly, the skin becomes soft and pliable, the hair glossy and abundant, and growth and physical development take place in nearly the normal way.

During the last few months I have been trying the extract of the pituitary gland in a case of chondrodystrophy. The patient is not a favorable subject, as the radiograph showed (at seventeen years) a premature synostosis at the lines of growth. The time under treatment is also too short to judge of the result.

There are several features in these cases which point to a possible connection between the deficient growth and an insufficient action of the pituitary gland. The lesion, however, is not necessarily a primary one of that organ. The disturbance in its function may be secondary to certain constitutional conditions.

I should strongly advise a careful test of this method of treatment in all cases of chondrodystrophy under fifteen years of age. A reliable preparation, preferably Merck's, should be used.

At the post-mortem examination of all cases of chondrodystrophy, especial attention should be paid to the condition of the pituitary gland.

THE CHEMISTRY OF COW'S MILK.

BY L. L. VAN SLYKE, PH.D.,

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Geneva, N. Y.

Until quite recently, we have been largely dependent for our data relating to the composition of cow's milk upon analyses published in European countries. Within the past fifteen or twenty years there has been accumulated by the work of the Agricultural Experiment Stations of the United States an enormous amount of material dealing with the composition of milk. The work thus done has not been of a haphazard or desultory character, but a full knowledge of the samples of milk analyzed has been furnished. In connection with these analyses, we are given such information as the breed, age, lactation period and stage of lactation of the cow or cows producing the milk. The knowledge thus furnished impresses one with the following facts: First, analyses of milk, either averages or individual, furnish little real information, unless we know something of the history of the samples. Second, analyses made in other countries may have little or no value when applied to milk produced in the United States. Third, any statement of so-called average composition of milk is misleading, because normal cow's milk varies so much in composition, while many averages that have been published are entirely misleading and thoroughly absurd.

We find in milk the following compounds and classes of compounds: (1) Water, (2) fat, (3) nitrogen compounds or proteids, (4) sugar, (5) salts.

WATER.—The water present in milk, however much its presence may be disguised, is the same compound of hydrogen and oxygen as that with which we are everywhere familiar.

The water present in milk serves the purpose of holding in solution the soluble constituents of the milk. It also acts as a diluent, better fitting the mixture for animal nutrition. The amount of water contained in milk varies considerably, depending upon a variety of conditions, such as individuality of cow, breed, stage of lactation, age, character of food, amount of water drunk, state of health, etc. Taking single milkings of individual

cows, we may find the water in 100 pounds of milk varying from 82 to 90 pounds or more. In case of milk from single cows during a whole period of lactation, the variation may range from 84 to 89 pounds. Taking milk from *herds* of cows, the variations are within narrower limits, usually ranging from 86 to 88 pounds. One hundred pounds of so-called average milk contain 87 to 87 $\frac{1}{4}$ pounds of water.

As regards the influence of breed, the following figures, taken from the records of this station, serve as a fair illustration:

NAME OF BREED.	POUNDS OF WATER IN 100 LBS. OF MILK.
Holstein	88.20
American-Holderness	87.35
Ayrshire	87.25
Short-Horn	85.70
Devon	85.50
Guernsey	85.10
Jersey	84.60

The following figures, showing the variation of water in milk, with advance of lactation period, are based upon averages derived from an aggregate of about 50 lactation periods of individual cows, covering a period of ten months from calving:

MONTH OF LACTATION.	POUNDS OF WATER IN 100 LBS. OF MILK
1	86.00
2	86.50
3	86.53
4	86.36
5	86.25
6	86.00
7	85.82
8	85.67
9	85.54
10	85.17

It is noticeable that there is a general tendency for the amount of water in milk to increase for the first three months of lactation, after which there is a continuous decrease to the end of the lactation period.

MILK-FAT.—Milk-fat, also called butter-fat, contains the three

elements—carbon, hydrogen and oxygen—in the following approximate proportions:

Carbon	75 per cent.
Oxygen	13 per cent.
Hydrogen	12 per cent.

From this statement one might infer that milk-fat is a single chemical compound. Such, however, is not the fact. Milk-fat is a somewhat variable mixture of several different compounds, each of which contains carbon, hydrogen and oxygen combined in different proportions. Each of these separate compounds, present in milk-fat, is formed by the chemical union of glycerin as a base with some acid or acids of a particular kind. These glycerin-acid compounds contain about ten different acids, but some of them are present in very small proportions. The four following are the acids entering most largely into the composition of milk-fat: palmitic acid, oleic acid, myristic acid and butyric acid. Other acids found in less amounts in milk-fat in combination with glycerin are stearic, dioxystearic, caproic, capric and lauric acids. One hundred pounds of milk-fat contain about $12\frac{1}{2}$ pounds of glycerin; of the glycerin-acid compounds or glycerids, there are, on an average, about 40 pounds of palmitin, 34 pounds of olein, 10 pounds of myristin, 6 pounds of butyrin, and other glycerids, ranging from less than 1 to nearly 3 pounds each. The proportions of these constituents of milk-fat vary somewhat, and this variation influences the character of the milk-fat. Palmitin and myristin tend to make milk-fat (or butter-fat) harder; while olein and butyrin have the reverse tendency.

Milk-fat is present in milk in the form of very small transparent globules. The sizes most commonly met with are those between one twenty-five-hundredth and one fifteen-thousandth of an inch in diameter, the average diameter being about one-ten-thousandth of an inch. The smaller fat globules are more numerous than the larger ones. In one drop of average milk there are about 150,000,000 fat-globules. It was formerly believed very generally, and is still held by some, that the fat-globules of milk are surrounded by a membranous covering. Without discussing the subject in detail, we may accept it as established beyond reasonable doubt that fat-globules have no special covering, but are simply minute particles of free fat floating in the form of an emulsion in milk. The size and number of fat-globules are influenced by a variety of conditions, such as advance of lactation, breed of

cow, food, age, health, different milkings, different parts of same milking, etc.

The amount of fat present in normal milk varies greatly, going below 2 per cent. and over 10 per cent., if we consider *single* milkings of individual cows. The average amount of fat in the milk of *herds* of cows varies more commonly between the limits of 3 and 5 per cent. The average amount of milk-fat in milk produced in this country, taking the true average for the entire year, lies somewhere near 4 per cent., perhaps a little under.

Many of the conditions that influence the amount of fat in milk have been studied and are well established, while others are but little understood. Some of the better known conditions will be briefly considered.

1. *Individuality*.—It is uncommon to find in a herd of cows any two individuals whose milk contains the same per cent. of fat, whether we consider single milkings or the average of many.

2. *Breed*.—It is well known that the per cent. of fat in milk varies in a somewhat characteristic way with the kind of breed. While there is marked variation in individuals of the same breed, there is found to be a fairly uniform difference, more or less marked, if we take the averages of several individuals. It is largely owing to this influence that we find the milk of one country differing from that of another, or the milk of one section of a country differing from that of another section. For example, the average per cent. of fat in milk in Germany and Holland is fully $\frac{1}{2}$ per cent. lower than in this country, because the prevailing breeds of cows there are the ones producing milk comparatively low in fat. The figures given in the following table are taken from the records of this station (Geneva), and represent averages of many individuals for several periods of lactation:

NAME OF BREED.	PER CENT. OF FAT IN MILK.		
	Average.	Lowest.	Highest.
Holstein	3.36	2.88	3.85
Ayrshire	3.60	3.20	4.24
American-Holderness	3.73	3.49	3.92
Short-Horn	4.44	4.28	4.56
Devon	4.60	4.30	5.23
Guernsey	5.30	4.51	6.13
Jersey	5.60	4.96	6.09

3. *Age*.—So far as published data throw light upon this ques-

tion, there appears to be a tendency for milk to become less rich in fat with each succeeding period of lactation, especially after the second, though individual exceptions are not infrequent. More data are needed to settle the matter.

4. *Advance of Lactation Period.*—In general, it is found that the per cent. of fat in milk increases as the stage of lactation advances. The following figures represent the averages obtained from an aggregate of nearly 50 lactation periods of different animals, covering ten months from the time of calving:

NUMBER OF MONTHS OF LACTATION.	PER CENT. OF FAT IN MILK.
1	4.54
2	4.33
3	4.28
4	4.39
5	4.38
6	4.53
7	4.56
8	4.66
9	4.79
10	5.00

5. *Variation of Time between Milkings.*—As a rule, the longer the time between two successive milkings, the smaller is the per cent. of fat in the milk; and the shorter the time between milkings, the greater the per cent. of fat. When the time between milkings is uniformly equal, the variation of fat in milk is small, provided the general environment of the animal is the same. However, as there is not commonly such entirely uniform conditions of surroundings during the day and night, there appears to be a common tendency for the presence of a little more fat in the morning's milk, even when the milkings are the same length of time apart.

6. *Variation in different portions of milk drawn from the udder.*—The following figures illustrate the general rule that the milk first drawn contains least fat and that the milk last drawn is richest in fat.

	PER CENT. OF FAT IN MILK.		
	Cow 1.	Cow 2.	Cow 3.
1st portion.....	0.90	1.60	1.60
2d "	2.60	3.20	3.25
3d "	5.35	4.10	5.00
4th "	9.80	8.10	8.30

It is also known that the per cent. of fat in milk varies in different quarters of the udder and also varies more or less with the order in which the teats are milked.

THE NITROGEN COMPOUNDS OF MILK.—Considerable confusion prevails in literature in respect to the nomenclature of the nitrogen compounds of milk. They have been comprehensively spoken of as albuminoids, proteids, etc. Frequently the term casein is used to include these different compounds. How many nitrogen or proteid compounds are present in normal milk? What are they? There have been reported by different workers all the way from one to seven or more proteid bodies present in cow's milk. It is not our purpose to show why this variation has occurred or to discuss the various compounds reported by different workers.

By the chemical evidence in hand, we are justified in believing that fresh, normal milk contains not more than four nitrogen-containing or proteid bodies; and these are casein, albumin, globulin and galactase. Globulin and galactase are present in so small quantities that we can regard casein and albumin quantitatively as being essentially the nitrogen compounds of milk.

Milk-casein is the most important proteid in milk because, first, it is the one present in largest quantity; second, its presence makes it possible to convert milk into cheese; and, third, it has high value as food. Milk-casein is most familiar to us in the form of the white, solid substance or curd, formed in milk when it sours, though, strictly speaking, this white substance is not milk-casein but casein lactate.

Milk-casein exists in milk, not in solution, but in the form of extremely minute, solid gelatinous particles in suspension. The slime found in the bowl of cream-separators consists largely of milk-casein.

Casein is a very complex chemical compound, containing the elements of carbon, hydrogen, nitrogen, sulphur and phosphorus. In milk the proteid molecule of casein is combined with calcium; hence the proper chemical name of milk-casein is *calcium casein*.

Action of Acids on Calcium Casein.—It has recently been shown in this laboratory by Mr. E. B. Hart and the writer, that when milk-casein (calcium casein) is treated with a very dilute acid, two chemical reactions take place. The first reaction to occur is the combination of the acid with the calcium of the calcium

casein, forming base-free casein or simply casein set free from its combination with calcium. On the addition of further acid, the casein molecule combines directly with the acid, forming a salt of the acid. Both casein and the casein salts of acids are insoluble, milk, the coagulum or curdled milk is casein lactate. The action of acids on calcium casein is hastened by increase of temperature. Both casein and casein salts of acids dissolve in excess of acids.

Action of Alkalies on Casein and its Compounds.—Dilute solutions of such compounds as hydroxides and carbonates of sodium, potassium, ammonium and calcium react with free-casein or its salts with acids, and form compounds that are easily soluble in water. These compounds do not react with the rennet ferment as does the natural casein of the milk. Some of these compounds are found in commerce as food preparations under such names as Plasmon Nutrose, Santogene, Eucasein, Galactogene, etc.

Action of Salts and other Substances on Calcium Casein.—Such salts as magnesium sulphate, sodium chlorid, ammonium sulphate, etc., when added in quantity sufficient to form a saturated solution, precipitate calcium casein. Other compounds in smaller quantities readily precipitate calcium casein, among which may be mentioned alum, zinc sulphate, mercuric chlorid, formalin, etc.

Action of Heat on Calcium Casein.—Heat alone under ordinary conditions, even at the boiling point of water, does not coagulate casein in milk. The formation of a peculiar skin on the surface of milk heated above 140° F. is largely due to the calcium casein of the milk, and not to albumin, as was formerly supposed. The skin itself contains practically all the constituents of the milk, and may be regarded as a kind of evaporated milk.

Action of Rennet on Milk-casein.—One of the most characteristic properties of calcium casein is its coagulation by the enzyme or chemical ferment contained in rennet, which is an extract of the mucous membrane of a calf's stomach. This property makes possible the manufacture of cheese from milk. The curd formed by the action of rennet (junket or curds and whey) is called paracasein or, more properly, calcium paracasein. Chemically, there is little or no difference between calcium casein and calcium paracasein. The coagulation of calcium casein by rennet is quite different from that produced by acids. Rennet produces, so far as we now know, only a physical change, while

acids convert calcium casein into salts of the acids used to precipitate it.

The action of rennet on calcium casein takes place in two stages: First, the rennet enzyme forms calcium paracasein from calcium casein. This action is wholly dependent upon the rennet. There is no change visible to the eye, neither increase of viscosity nor apparent coagulation. In the absence of soluble calcium salts, the calcium paracasein remains in this uncoagulated form. This stage of action takes place as well in the cold as at higher temperatures.

Second. In the second stage, increased viscosity and visible coagulation take place, and this change is supposed to be caused by the action of soluble calcium salts, the action being either physical or perhaps a loose form of chemical combination. After the first stage is completed or nearly so, that is, the conversion of calcium casein into calcium paracasein, coagulation begins and then proceeds quite rapidly.

Calcium paracasein, coagulated, is known to us in an impure form as fresh cheese-curd (junket or curds and whey). When treated with dilute acids, it behaves much like calcium casein. The first portion of acid used removes the calcium and leaves free paracasein, while further addition of acids forms with the free paracasein salts of the acids used. The proteid compound present in freshly made cheese of the type (cheddar) common in the United States is largely free paracasein.

Conditions of Rennet Coagulation.—The following are some of the more important facts in reference to the action of rennet upon milk casein in causing coagulation.

(1) The presence of soluble lime salts appears to be necessary for rennet coagulation of milk.

(2) The reaction must be neutral to litmus, or acid, but not alkaline. Acids, whether organic or inorganic, though they differ from one another in respect to the intensity of influence they exert on rennet action, show very marked effect upon the coagulation of calcium casein by rennet. This effect of acids upon rennet action is commonly explained by saying that the addition of acid dissolves the insoluble calcium phosphate of milk and thus increases the amount of soluble calcium salts. The claim is also made by some that the acid in itself has some direct influence upon the action of rennet.

(3) Dilution of milk by water delays rennet coagulation of

milk, because the proportion of soluble calcium salts is decreased. Addition of calcium chlorid or of a free acid to milk diluted by water not only hastens the time of coagulation but increases the amount of calcium casein coagulated.

(4) Different chemical compounds affect the coagulation of milk by rennet in different ways. Many acid salts act like free acids in hastening rennet action. Alkalies and alkaline salts retard it. The following substances also are among those that retard rennet action: Sodium chlorid, disodium hydrogen phosphate, sodium acetate, boric acid, chloroform, formalin, etc.

When lime water is added to cow's milk until it is neutral or faintly alkaline to phenolphthalein, a basic calcium casein is formed which is not acted upon by rennet, and will not form a curd even in the presence of soluble lime salts. Other alkalies probably produce similar basic compounds with casein.

(5) Addition of foreign inert matter, like starch or sawdust, hastens rennet action.

(6) Temperature affects the rapidity of coagulation of milk by rennet. For complete action, the time decreases as the temperature increases. In a given time rennet coagulates milk most completely at 106° to 108° F., and less completely at temperatures above and below this.

(7) The temperature of coagulation affects the character of the coagulum. At 60° F. the curd is flocculent, spongy and soft; at 77° F. to 113° F. it is more or less firm and solid; at 122° F. and above, it is very soft, loose and more or less gelatinous.

(8) Rennet heated for some time to over 140° F. becomes permanently weaker or inactive and is somewhat affected at about 120° F. Weak solutions are more easily affected than strong solutions by increase of temperature.

(9) Increase in amount of rennet in proportion to milk hastens rapidity of coagulation; likewise, increase in strength of rennet.

(10) Milk freshly drawn curdles more completely than when allowed to cool, due to temperature and perhaps to the presence of carbon dioxide.

(11) Milk heated above 150° F. for a considerable length of time coagulates less rapidly than normal milk. The coagulum of heated milk is highly flocculent, unless one adds soluble calcium salts or some acid. Boiled milk does not coagulate nor-

mally, if at all, by rennet. Heating milk decreases the amount of soluble calcium salts in the milk and also removes any carbon dioxid that may be present.

(12) Milk from different cows or from the same cow at different times behaves very differently toward rennet.

Decomposition Products of Calcium Casein.—Under the influence of chemical reagents, of enzymes and of various organisms, calcium casein may be changed into a great number of other substances. Among the compounds and classes of compounds thus formed, we mention the following: Paranuclein, albumoses, peptones, amides or crystallizable bodies, and ammonia. These products are never found in normal milk as it leaves the cow, but may be in milk that has stood some time. From the physician's standpoint fresh milk may be thirty-six hours old. To him it is fresh when *delivered*. The methods devised for the quantitative separation and determination are detailed in Bulletin 215 of the New York Agricultural Experiment Station (Geneva).

Milk-albumin.—Milk-albumin differs from milk-casein in many ways. First, milk-albumin is not acted upon by rennet; second, it is not coagulated by acids at ordinary temperatures; third, it is coagulated by heat alone, though not completely, above 160° F.

Milk-globulin.—This compound is present only in minute quantities in normal milk and has little special interest.

Galactase.—Galactase was discovered by Drs. Babcock and Russell several years ago. It is present in very small amounts. It is a ferment, somewhat like pepsin in character.

Amounts of Different Proteids in Milk.—In single milkings of individual cows, the calcium casein and albumin taken together vary from 2.5 to 6 per cent. and average about 3.2 per cent. Calcium casein varies from 2 to 4 per cent. and averages about 2.5 per cent. Albumin varies from 0.5 to 0.9 per cent. and averages about 0.7 per cent.

The amount of nitrogen compounds in milk is influenced by many conditions, such as influence the general composition of the milk, among which are individuality, breed, advance of lactation, etc. The general tendency is for an increase of calcium casein and albumin as the lactation period advances. This is illustrated by the following figures:

MONTH OF LACTATION.	PER CENT. OF CALCIUM CASEIN IN MILK.	PER CENT. OF ALBU- MIN IN MILK.
1	2.45	0.55
2	2.45	0.51
3	2.51	0.57
4	2.48	0.62
5	2.55	0.65
6	2.65	0.92
7	2.91	0.75
8	3.00	0.77
9	3.15	0.88
10	3.66	1.39

Relation of Calcium Casein to Albumin in Cow's Milk.—The general statement is prominently current in literature to the effect that casein and albumin are present in milk in very constant relative proportions, the amount of calcium casein being five times that of albumin. The writer has studied this question with a great variety of milk taken from both herds and individuals. He has found that calcium casein and albumin vary greatly in their quantitative relations to each other. Taking the amount of albumin as one, calcium casein varies all the way from 2.6 to 5.6, the average being about 3.6 parts of casein for 1 of albumin.

Relation of Fat and Nitrogen Compounds in Milk.—An examination of many individual analyses of milk, especially of analyses given by German, French and English authorities, would make it appear that milk usually contains about as much casein and albumin as fat and in some cases even more.

In examining about 8,500 analyses of American milks, covering samples obtained from individual cows, from herds, and from cheese factories, the writer has found that it is quite exceptional that normal milk containing over 3 per cent. of fat contains more calcium casein and albumin than fat. In normal milk containing less than 3 per cent. of fat, the rule is that the fat is less in amount than the calcium casein and albumin. In milk containing over 3 per cent of fat, the nitrogen compounds exceed the fat only in exceptional cases, and generally only when the cow is very far along in lactation.

The normal tendency appears to be for the nitrogen compounds to increase relatively to the fat with the advance of lactation.

In 5,500 samples of American milks, with a fat content lying between 3 and 5 per cent., the fat averaged 3.92 per cent. and the nitrogen compounds 3.20 per cent., or a ratio of 1 part of nitrogen compounds to 1.225 parts of fat. This relation has a value in enabling us to identify milk that has been skimmed in any marked degree. In examining results obtained with fifty different herds of cows where the milk was examined once a week for six months, from May to October inclusive, there were found only 2 cases in which the fat was as low as the nitrogen compounds. When the per cent. of fat drops below that of nitrogen compounds, the milk may be confidently regarded as skimmed, especially in the case of milk from herds.

THE SALTS OF MILK.—The salts of milk play important parts in milk and its products, though present in only small amounts. But our detailed knowledge of these constituents, of their relations to one another and to other constituents of milk is very incomplete. We commonly speak of the salts of milk as the ash or mineral constituents. This conception is misleading, because we have reason to believe that, to some considerable extent, the inorganic elements are combined with organic molecules. Hence, the ash represents more than the so-called mineral constituents of milk. While the ash amounts to about 0.7 per cent. in milk, the salts probably approximate 0.9 per cent.

Söldner has made some suggestions as to the forms in which the salts of milk are present. Thus, he states that in 100 parts of the salts of milk, the individual compounds may be present in the following forms and amounts:

Calcium citrate	23.55 per cent.
Potassium acid phosphate	12.77 " "
Sodium chlorid	10.62 " "
Dipotassium phosphate	9.22 " "
Potassium chlorid	9.16 " "
Tricalcium phosphate	8.90 " "
Monocalcium phosphate	7.42 " "
Potassium citrate	5.47 " "
Calcium oxid combined with casein.....	5.13 " "
Magnesium citrate	4.05 " "
Magnesium hydrogen phosphate	3.71 " "

Much work must be done before this field is satisfactorily cleared.

Digestibility of Casein and Paracasein and some of their Compounds.—In the absence of acid, calcium paracasein fails to be digested by pepsin, while paracasein (the chief nitrogen compound of fresh cheddar cheese, or curd, which is our common American hard cheese), paracasein lactate, casein, casein lactate (cottage cheese) and casein hydrochlorid are partially digested. Casein and paracasein, in the absence of acid, are digested more than their lactates. In the presence of 0.4 per cent. of hydrochloric acid, paracasein lactate is digested by pepsin more than is paracasein. Paracasein and casein and their lactates digest more readily and completely in the presence of free hydrochloric acid than in its absence. Casein lactate and casein hydrochlorid do not differ in the rapidity and extent to which they are converted into soluble compounds by pepsin. The rapidity of digestion is dependent in part upon the fineness of material digested. Cottage cheese, as ordinarily consumed, is in a state of finer division than cheddar cheese. Cottage cheese may be regarded as more readily digestible than new cheddar cheese for two reasons: First, the casein lactate, the chief solid constituent of cottage cheese is more digestible in the presence of free hydrochloric acid than is paracasein, the principal proteid of new cheddar cheese. Second, cottage cheese is in such a mechanical condition that it admits of easier attack by the digestive agents than does new cheddar cheese. For the details of the work summarized by the foregoing statements, the reader is referred to the *American Chemical Journal*, Vol. XXXII., p. 154, and also to Bulletin No. 245, New York Agricultural Experiment Station, Geneva, N. Y.

General Suggestions.—One cannot fail in studying the data that have been presented in relation to the composition of normal milk of cows to realize that normal milk is very variable in composition. In taking any average statement of composition of milk as a basis for modifying normal milk, one is quite likely to go far astray. In modifying the composition of milk for use with invalids or children, the only way that is really safe is to know the content of fat and proteids in the particular sample of milk that one is going to use. The determination of fat is entirely practicable by the use of a small Babcock tester, which can be obtained at any chemical supply house. Having obtained the per

cent. of fat, the following figures will serve as an approximate guide to the amount of casein and albumin in the milk.

PER CENT. OF FAT IN NORMAL MILK.	PER CENT. OF CASEIN AND ALBUMIN.
3.0	2.90
3.5	3.10
4.0	3.30
4.5	3.50
5.0	3.65
5.5	3.80
6.0	3.95

Ichthyol in Tuberculous Lymph Nodes.—Dr. Walker Overend says that he has administered ichthyol with benefit in many instances where suppuration has seemed imminent or has already taken place. It has also been recommended in pulmonary phthisis when the cavities have become septic on account of the fact that it favors the process of desiccation. The above considerations led him to give it a trial in the treatment of the enlarged tuberculous lymph nodes in children. In a child, eight years of age, after an attack of influenza, a large mass which reached the size of a walnut formed on each side of the trapezius and appeared to be on the point of suppuration. There was some difficulty, however, in the exhibition of the drug. Children, as a rule, will neither take pills nor capsules, but they will readily take tablets when made thin and rather smaller than the ordinary size. Tablets of ferrichthyol, each containing $1\frac{1}{2}$ grain of ichthyol combined with iron carbonate or reduced iron, were given three times a day after meals. After four days the nodes began to diminish; in a fortnight the enlargements had vanished. The effect of each tablet was shown by a lowering of the temperature.

In a boy, five years of age, sent to the seaside with a very large tuberculous lump beneath the jaw, perfect resolution was accomplished after a month's trial of the drug, and the question of surgical interference was dismissed after the first fortnight. The treatment was supplemented by an open-air life and an appropriate diet, in which meat, milk, and eggs, with stimulant, were essentials. The effect, however, is much more marked if the nodes have only recently become enlarged.

At times old tuberculous lymph nodes are liable to suppurate and to discharge for weeks; ichthyol often checks the secretion and closes the sore.—*The Lancet.*

Clinical Memorandum.

A FATAL CASE OF ACUTE RHEUMATIC ENDOCARDITIS WITH RHEUMATIC SYMPTOMS IN JOINTS AND MUSCLES BARELY NOTICEABLE.*

BY EDWIN E. GRAHAM, M.D.,

Professor of the Diseases of Children in the Jefferson Medical College,
Philadelphia.

I was called on January 11th by Dr. C., to see the child of Dr. S., aged four and a half years, and obtained the following history:—The boy had, during his first year, suffered from a mild attack of ileocolitis, otherwise he had always been strong and healthy; the family history was good, no rheumatic or tuberculous tendencies. December 13th the boy had been taken on a sleigh ride a few miles in the country by his father. It was a clear, dry, crisp morning, he was well bundled up, and was in apparently the best of health. Upon their return home, the boy complained of feeling rather stiff, when lifted out of the sleigh, and during the subsequent week he complained of slight stiffness, but not enough to keep him off his feet, in fact, he played with his toys and acted very much as was his usual custom. Twenty-four hours before my visit, a slight cough developed; his urine became scanty, containing considerable albumin and one or two hyaline casts. When I saw him at 8 P.M., on January 11th, his temperature was 101° F., respiration 40, pulse 150. He complained of little or no pain, his limbs could be moved with little or no discomfort, and his mother informed me that about the only time he had complained was during the day, in stooping down to lift some toys from the floor, when he spoke of some slight stiffness in his legs.

The lungs were clear. In the mitral area, the first sound of the heart was entirely replaced by a soft, blowing, mitral murmur. The second sound of the heart in the mitral area was clear and distinct. This murmur was transmitted well to the axillary line and to the angle of the scapula. It became fainter at midsternum, and still fainter at the aortic cartilage. The amount of urine passed had increased since the examination made twenty-four

* Read before the Philadelphia Pediatric Society, April 11, 1905.

hours previously; the albumin had almost disappeared and no casts could be found. The case was evidently, one of acute rheumatic endocarditis where the inflammation, with all its violence, had attacked the endocardium in the region of the mitral valve, rather than the joints of the body. The boy was unusually sturdy and well developed, and previous to the present illness he had never suffered from dyspnea on exertion; in fact, he had been able to romp and run with the best of his associates; he had never had cyanosis; had never had any evidences of rheumatism, and previous to the present illness he had never suffered from any infectious disease, which could affect the endocardium. The conclusion seemed to me to be that the endocarditis was a primary endocarditis, that it was a simple endocarditis, not a malignant endocarditis, and that the inflammation in the mitral leaflets was of an unusual severe character. The rapid respiration, cough, scanty urine and albuminuria were due, undoubtedly, to the congestion resulting from the heart lesion.

The boy's clothing was removed at once, and he was placed in bed in the charge of a competent trained nurse, and was kept absolutely at rest. The bowels were moved by fractional doses of calomel followed by a saline; he was given liquid nourishment in the shape of milk every three hours and an abundance of water. Five grains of salicylate of soda were administered every fourth hour, and one drop of veratrum viride every three hours. The next day, Wednesday, at noon, the temperature had fallen to $99\frac{1}{2}^{\circ}$ F.; the heart action was slower, 140; the cough less; the dyspnea was less, and the urine was being passed in larger amounts, and the boy seemed distinctly more comfortable.

Friday morning, at 12 A.M., he awoke out of a dream very much frightened and excited; his shortness of breath became very much worse, dyspnea became marked, and he died at 1 A.M., one hour later.

The case seems to me to be of unusual interest for a number of reasons. The rheumatic symptoms were of such a passing character. The boy was able to be on his feet until about thirty hours before his death. The endocarditis was almost the only manifestation of rheumatism. It was simple endocarditis, and not malignant. The early termination in death in exactly one month.

(The discussion of this case will be found on page 556 of this number of ARCHIVES OF PEDIATRICS.)

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CHILDREN'S NERVES AND PLAY.

This is the season when the nervousness of children is brought more to the attention of parents and to those who are particularly interested in caring for children than at any other time of the year. Children who have been going to school are almost sure, at the end of the school year, to be suffering from an over-irritability of the nervous system that manifests itself in capricious appetite, a tendency to sleep less than is good for them and a diminution of weight for height that indicates a disturbance of the nutritional equilibrium. Unfortunately, particularly with regard to city children, these nervous conditions are becoming more and more com-

mon, and, after studying their school hours and daily routine, it is no longer any wonder that grown-up Americans are increasingly nervous.

Many reasons have been pointed out for this unfortunate nervous tendency, which is especially manifest among city children, and every faddist is almost sure to find in it indications of the fact that his particular fad is neglected, or that there is a violation of what he considers some absolutely essential rule of life. We can, however, all agree that the distinguishing characteristic between the city child and the country child is the absence of play, in the proper sense of the word, from the daily life of the child in crowded city streets. City children scarcely know the meaning, of the word play, and many of them when taken into the country have to be taught even the simplest games. This is, perhaps, the saddest feature of the over-strenuous life of the modern large cities. There is no opportunity for that complete relaxation of mind which comes with play more than with any other form of amusement.

All life in these days has become too serious, and even pleasure itself has become such an effort as to lose most of its beneficial effects. When children are considered, however, there is a sad lack of facilities for intellectual relaxation. City children of the better class grow up in families where there are at most one or two playmates, and only too often there is none. This means that the young mind is constantly stimulated by contact with the minds and ways of grown up people and, as a consequence, has very few opportunities for the spontaneous exercise of its own activities apart from the consciousness of effort to please or, at least, to consider the wishes and moods of others. Almost needless to say, there is very little, if any, relaxation for a child when taken out for a formal, daily walk with its nurse only to have, as is so often the case, most of its efforts at play with other children with whom it may possibly come in contact, so constantly overseen as to make spontaneity impossible. To one who knows the happy, thoughtless ways of country children, in their games and sports,

there is no sadder spectacle than the park walk of nurses and children. Intercourse with other children, especially if they are not well dressed, is usually forbidden.

Not seldom does it happen that when children are supposed, at least, to be having the benefit of the outdoor air they are really not enjoying this privilege, since their nurse finds it more amusing to take them some place where she will find congenial company. Over and over again has it been the experience of physicians, called to see children suffering from contagious diseases in the city homes of the wealthy, to learn that the exposure to the contagion probably took place during the course of the visit of the nurse and the little one to some tenement house where the nurse's friends lived.

What is needed, then, more than anything else in our modern city life are real playgrounds for children and encouragement to play. In this way the restless muscular activity of the child given to it for the very definite purpose that by function growth and nutrition should be encouraged, will find its proper exercise. Without it, there is a constant tendency to the presence of irritating materials in the circulation that should have been used up in the muscles. It must be borne in mind that muscles, after all, are much more than merely bands of tissue, by which mechanical movements are facilitated. Nature is always truly economic in her management, and as the cancellated bones have a secondary blood-making purpose, so the muscles have the secondary office of the great heat-making organs of the body. If they are not suitably exercised, extra work is thrown upon the other organs and, above all, the nervous system suffers from the presence of superabundant nutrition, that was meant mainly to be used by the voracious muscle cells when they are properly active.

There is probably no other phase of modern life in which the physician can do more service for the rising generation than by the encouragement of facilities for play. There must be playgrounds on the roofs of our city school and public buildings; and one physician has shown how much can thus be accomplished.

The park greens must be open for children to play on them, not alone on certain selected days of the year, but on every day, and children must be taught and encouraged in every possible way to enter into games without a thought of themselves or the sparing of their clothes, or the formalities of life. At present they are taking life entirely too seriously and the result is the nervous wrecks in young adult life that are becoming more and more sadly frequent. Our school buildings should be like the teaching places of the Greeks, provide opportunities for play as well as for study. It is curious that our word school comes from the Greek word that means leisure, while the Latins called school *ludus*, which signifies primarily play. These precious ideas are being too much lost sight of, and the result is precocious prigs, but not healthy children.

The Treatment of Epilepsy and Neurasthenia.—According to Dr. Eduard Thumen, one of the advantages of bromipin over the alkalin bromids is that it can be used for long periods without affecting the digestion. In a case of epilepsy with very frequent attacks, bromipin has rendered excellent service. The patient received a tablespoonful of the 10 per cent. preparation of bromipin, with a good nourishing diet, and under this treatment the attacks became milder, and then ceased altogether for three months, while before they would occur almost every week. There were no intestinal or gastric disturbances and no skin eruption.

The author also had excellent results from bromipin in several cases of neurasthenia and hysteria. The nervous cardiac palpitation which neurasthenics experience, especially at night, is very favorably influenced by a teaspoonful of bromipin. It renders the same service in nervous excitement, nervous insomnia, and nervous vertigo. In giving bromipin to scrofulous children suffering with vertigo, the author claims to have noticed a diminution of the lymph nodes, which he ascribes to the sesame oil of the bromipin. —*Deutsche Medizinische-Zeitung.*

Bibliography.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by **Hobart Amory Hare, M.D.**, assisted by **H. R. M. Landis, M.D.** Vol. II., June 1, 1905. Pp. vi-346, illustrated. Philadelphia and New York: Lea Brothers & Co., 1905. Price, \$6 per annum.

Coley's work in hernia is well known, and his views on operative treatment for undescended testis are of interest in connection with the statistics of Fisher, Odiarne and Simmons, Marshall, Eccles and others. Coley has operated upon 70 cases of undescended testis: "20 of these were adults from fifteen to forty years; 48 were children under the age of fifteen years. Twelve adult cases have been observed from three to eight years. There has been no return of the hernia in any case."

A statement that may relieve the minds of some pediatricians is the following: "Practically all cases of umbilical hernia in children may be cured by mechanical means."

Foote's acknowledgment that many surgeons scoff at the diagnosis of a congenital stenosis of the pylorus should be a reminder to physicians and surgeons alike that this condition is now recognized as operable.

Acute leukemia in children has not been so frequently reported as in adults, but this is probably due to a failure in making the necessary examinations. The symptoms and clinical course of the disease are much the same as in the adult, always terminating fatally. In addition to the above view Stengel quotes the opinion of Dock that tuberculosis and leukemia may after more extensive observation be found to be in combination more often than is now recorded.

There are many other subjects of interest in this popular quarterly.

The Influence of Growth on Congenital and Acquired Deformities. By **Adoniram Brown Judson, A.M., M.D.** Pp. x-226, illustrated. New York: William Wood & Co., 1905.

This volume is the result of the author's intention to prepare a paper on the influence of growth. After a brief introduction Dr. Judson takes up his subjects in the following order: Congenital Club Foot, Deformities Caused by Infantile Paralysis, Tuberculous Joint Disease, White Swelling of the Knee, Treatment of Hip Disease, Abscesses of Hip Disease, Diagnosis,

Prognosis, and Appreciation of Results of Hip Disease, Causes and Prevention of the Deformity of Hip Disease, Pott's Disease of the Spine and Lateral Curvature of the Spine. A glance at the titles of the chapters shows how important a bearing growth has on these orthopedic conditions.

Under the heading of congenital club foot the author states that it is an affection easily responsive to treatment, and it is as a rule well and promptly corrected by the method and with the instrument and materials most conveniently under the control of the physician responsible for the case. Better results are reached by patiently relying on slow methods and natural growth than by resorting to forcible correction, repeated whenever the deformity becomes offensive through neglect.

The disabilities of infant paralysis require early and very prolonged attention in practice. Mechanical treatment is required at the outset, and will be necessary through the time of growth and afterward.

These statements indicate the character of the book. Many of the directions for the treatment of deformities appeal directly to the orthopedic surgeon, but there is throughout a definite appreciation of the growth of the body and of the need of developing muscles which, without mechanical aids to locomotion, would become atrophied and inert.

The author's personal views are the result of a long experience in orthopedic surgery, and are so practical that the book will prove most helpful to physicians who see the deformities of infants and children.

The volume is well printed and contains a number of illustrations, some of which are not up to the standard of the text.

Lehrbuch der Kinderkrankheiten für Aerzte und Studierende von Dr. Adolf Baginsky, Professor der Kinderheilkunde, an der Universität Berlin, etc. Eighth Edition. S. Hirzel, Leipzig: 1905. Price, 1650 marks.

The seventh edition appeared in 1903. That an eighth is so soon required is good evidence of the merit and appreciation of the author's work. The essential features of the book remain the same as before. In the new edition we find evidences of an effort at more exact and scientific classification. Thus, in the section in the seventh edition devoted to affections of the newly-born, there is no classification of the diseases treated of. In the new edition we find

these diseases treated under three heads: 1. Mechanical Affections, including Aphyxia Neonatorum, etc. 2. Mechanical and Infectious Affections, including Icterus Neonatorum, Melena Neonatorum, etc. 3. Infectious Affections, including Septic Infections, etc. Similar changes are to be found in other parts of the book, all bearing evidence that the new edition is not merely a reprint. The author's preface assures us that he has carefully gone over the whole work, endeavoring to embody in it the results of his riper experience and more mature thought. There are frequent references to recent literature. Thus we find the author speaking guardedly of the relation of the Shiga bacillus to the diarrheas of infancy and childhood, as it has been developed by the pupils of Flexner.

Altogether, it is evident that the new edition will thoroughly maintain the high reputation of its predecessors.

Clinical Treatises on the Pathology and Therapy of Disorders of Metabolism and Nutrition. By Prof. Dr. Carl von Noorden. Authorized American Edition. Translated under the direction of Boardman Reed, M.D. Part VI. **Drink Restriction (Thirst Cures). Particularly in Obesity.** By Dr. von Noorden and Dr. Hugo Solomon. New York: E. B. Treat & Co., 1905. Pp. 86. Price, 75 cents.

The earlier volumes of this series have from time to time been reviewed in this journal. The present volume is devoted to the question of the value of restriction in the use water, not of alcoholic beverages, in various pathologic conditions, especially obesity. The first part contains an interesting historical review of the therapeutic employment of thirst-cures by Schroth, Oertel, and others. The second chapter contains an historical review of the physiological investigations on the effect of thirsting on the organism, particularly upon metabolism. This is followed by two chapters on the author's investigations on the effect of thirsting upon the metabolism of human subjects. The final chapter deals with therapeutic considerations, including the restriction of liquids in reduction cures, in chlorosis, cirrhosis of the liver, and hemorrhages. An extensive bibliography is appended. The volume reveals again the author's extensive knowledge of the literature of his subject, his wide clinical observation, and sound judgment. The translation is excellent, and the book offers delightful as well as instructive reading. As with its predecessors, the printing and make-up of the book add to its attractiveness.

Society Reports.

MINUTES OF THE SEVENTEENTH ANNUAL MEETING OF THE AMERICAN PEDIATRIC SOCIETY.

*Held at Hotel Sagamore, Lake George, N. Y., on June 19,
20 and 21, 1905.*

The following members were present: Doctors I. A. Abt, Chicago; G. N. Acker, Washington; S. S. Adams, Washington; A. D. Blackader, Montreal; W. D. Booker, Baltimore; E. M. Buckingham, Boston; W. L. Carr, New York; H. D. Chapin, New York; F. M. Crandall, New York; D. L. Edsall, Philadelphia; E. E. Graham, Philadelphia; J. P. Crozer Griffith, Philadelphia; A. Hand, Jr., Philadelphia; L. E. Holt, New York; F. Huber, New York; A. Jacobi, New York; C. G. Jennings, Detroit; C. G. Kerley, New York; H. Koplik, New York; L. E. La F  tra, New York; J. H. McCollom, Boston; C. F. Martin, Montreal; J. L. Morse, Boston; T. M. Rotch, Boston; E. W. Saunders, St. Louis; H. L. K. Shaw, Albany; I. M. Snow, Buffalo; C. W. Townsend, Boston; A. H. Wentworth, Boston.

The following visitors were present:—Doctors C. F. Gardner, Colorado Springs; A. R. Mills, University of Sydney, Australia; G. R. Pisek, University of Vermont.

FIRST SESSION, JUNE 19, 2 P.M., HOTEL SAGAMORE.

Dr. J. P. Crozer Griffith, of Philadelphia, read a paper on "Sclerema Neonatorum."

Discussion by Drs. Koplik, Jennings, Jacobi and Griffith.

Dr. J. Lovett Morse, of Boston, presented a paper entitled, "Acid Autointoxication in Infancy and Childhood."

Discussion by Drs. Edsall, Koplik, Holt, Rotch, Crandall, Townsend, Jacobi and Morse.

Dr. Henry Dwight Chapin presented "Notes on the Examination of the Urine of Infants: (a) In Digestive Disturbances; (b) In Pulmonary Disturbances; (c) In Other Conditions. Methods of Collecting Urine for Examination."

Discussion by Drs. Holt, Edsall, Crandall, Morse, McCollom, Jacobi, Jennings, Koplik and Chapin.

Dr. A. Jacobi, of New York, reported "A Case of Sepsis in the Newly-born."

Discussion by Drs. Holt, Huber, Koplik, Edsall, Saunders and Jacobi.

Dr. A. H. Wentworth, of Boston, reported "A Case of Acute Yellow Atrophy of the Liver in a Child."

Discussion by Dr. Griffith.

Dr. L. Emmett Holt, of New York, read a paper on "Multiple Tumors of the Abdomen."

Discussion by Drs. Blackader, Buckingham, Huber and Holt.

Dr. Charles G. Jennings, of Detroit, reported "A Case of Abdominal Tumor."

SECOND SESSION, JUNE 19, 8 P.M., HOTEL SAGAMORE.

Dr. J. P. Crozer Griffith presented the "Report of a Case of Stenosis of the Pylorus in Infancy."

Drs. Thomas Morgan Rotch and Maynard Ladd, of Boston, reported "Two Operative Cases of Pyloric Stenosis in Infants."

Discussion of the two papers by Drs. Morse, Abt, Holt, Griffith and Rotch.

Dr. E. W. Saunders, of St. Louis, read a paper entitled, "A Plea for the More Timely Use of Intubation in Laryngeal Stenosis, and for the Use of Tracheotomy in Certain Neglected Cases."

Discussion by Drs. Chapin, Booker, McCollom, Adams, Crandall, Abt and Saunders.

Dr. George N. Acker, of Washington, reported "A Case of Porencephalus."

Discussion by Dr. Abt.

Dr. Henry Koplik, of New York, presented "A Contribution to the Pathology and Causation of Congenital Stridor: Case and Autopsy."

Discussion by Drs. Morse, Griffith, Blackader, McCollom, La Fétra and Koplik.

Dr. Henry L. K. Shaw, of Albany, read a paper on "The Use of Citrate of Soda in Infant Feeding."

Discussion by Drs. Graham, Chapin, Abt, Holt, La Fétra, Kerley and Shaw.

THIRD SESSION, JUNE 20, 10 A.M., AT THE RESIDENCE

OF DR. JACOBI, BOLTON LANDING.

The annual address of the president, entitled "The Medical Supervision of Schools and the Progress of School Hygiene," was read by Dr. Charles G. Jennings, of Detroit.

On motion of Dr. Blackader the address was referred to the Council for consideration and report.

Drs. A. D. Blackader and A. D. Gillis, of Montreal, presented the report of "A Case of Acute Lymphatic Leukemia in a Child Aged Fourteen Years."

Dr. Alfred Hand, Jr., of Philadelphia, reported "A Case of Acute Lymphatic Leukemia in a Child Aged Five Years."

Discussion of both papers by Drs. Holt, Koplik, Edsall, Morse, Abt, Blackader and Hand.

Dr. Henry Koplik presented, for Dr. Henry Heiman, of New York, "A Study of the Leukocyte Count in the Bronchopneumonia, Lobar Pneumonia, and Empyema of Infants and Children."

Dr. Francis Huber, of New York, read a paper entitled, "Costal Synostosis about Drainage Tubes in Empyema."

Discussion by Drs. Graham, Koplik, Jacobi, Blackader, Kerley and Huber.

Dr. S. S. Adams reported "A Case of Uncinariasis in a Child."

Discussion by Drs. Acker, Graham, Rotch and Adams.

Dr. Charles W. Townsend, of Boston, reported "An Unusual Case of Tuberculosis in an Infant."

Discussion by Drs. Rotch, Blackader, Buckingham, Morse, Edsall, Saunders, Kerley, Blackader, Holt and Townsend.

Dr. Henry L. K. Shaw presented a case of "Congenital Heart Disease without Cyanosis."

EXECUTIVE SESSION, JUNE 20, 8 P.M., HOTEL SAGAMORE.

Dr. J. P. Crozer Griffith presented the report of the Council, upon whose recommendation the following action was taken:

The officers elected for the ensuing year were: President, Dr. A. Jacobi; First Vice-President, Dr. F. Huber; Second Vice-President, Dr. A. H. Wentworth; Secretary, Dr. Samuel S. Adams; Treasurer, Dr. J. Park West; Recorder and Editor, Dr. Linnæus E. La Fétra.

Dr. Samuel McC. Hamill was elected a member of the Council to succeed Dr. F. Forchheimer, retired.

The Society voted to hold the next annual meeting at Atlantic City, N. J., May 30, 31, and June 1, 1906.

Dr. William Osler, Oxford, Dr. A. Baginsky, Berlin, and Dr. V. Hutinel, Paris, were elected to honorary membership.

Elected to membership were Dr. John Howland, New York,

Dr. T. S. Southworth, New York, Dr. John Ruhräh, Baltimore, and Dr. J. H. Mason Knox, Baltimore.

The proposition of E. B. Treat & Co. in regard to the publication of the Transactions of the Society was accepted.

An assessment of \$15 per member was ordered. To defray the expenses of the American Committee on the International Congress \$25 were appropriated as the Society's proportion.

The treasurer's report was audited and found correct.

Upon nomination by the Council Drs. Jennings, Jacobi and Abt were elected members of the "Committee on the Welfare of Children." The objects of this committee are to look after the general and hygienic interests of children and especially to represent the Society in conferences with committees of educational and legislative bodies.

Dr. Jacobi was elected delegate to the Fifteenth International Medical Congress at Lisbon, 1906.

FOURTH SESSION, JUNE 20, 9 P.M., HOTEL SAGAMORE.

Dr. J. P. Crozer Griffith presented for Dr. Myer Solis-Cohen, of Philadelphia, a paper on "Temperature, Pulse and Respiration Relationships in Infancy and Childhood."

Discussion by Drs. Holt, Jacobi, Hand and Griffith.

Dr. D. L. Edsall, of Philadelphia, read a paper entitled, "Milky, Non-fatty Effusion in a Case of Hodgkin's Disease."

Discussion by Drs. Graham, Jacobi, Huber and Townsend.

Dr. E. E. Graham, of Philadelphia, presented a paper on "The Results in Children of Descapsulation of the Kidneys for Nephritis, with the Report of an Apparently Successful Case in a Child Aged Twenty-six Months."

Discussion by Drs. Huber, Pisek (guest) and Graham.

Drs. Alfred Hand, Jr., and J. C. Gittings, of Philadelphia, read "An Analysis of 145 Cases of Typhoid Fever in Children."

Discussion by Drs. Buckingham, Adams, Griffith, Blackader, Abt, Saunders and Hand.

The following papers were read by title:

Dr. W. P. Northrup, of New York, "High Per Cent. Fat in a Mother's Milk, Producing Severe Enterocolitis in Her Infant."

Dr. A. C. Cotton, of Chicago, "A Case of Congenital Extrophy, with Extroversion of the Bladder and other Anomalies."

Dr. Irving M. Snow, of Buffalo, "The Eye Symptoms of Infantile Scurvy: Autopsy; Large Infected Retrobulbar Hematoma."

LINNÆUS E. LA FÉTRA, M.D.,

Recorder.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION
ON PEDIATRICS.

Stated Meeting, April 13, 1905.

L. E. LA FÉTRA, M.D., CHAIRMAN.

A CASE OF CONGENITAL DEFECTS OF SOME OF THE MUSCLES OF THE
SHOULDER GIRDLE.

DR. CHARLES HERRMAN, in presenting the patient, said that in congenital muscular defects the most frequently involved muscle was the pectoralis major. The right side was most often affected and males were more often afflicted than females. There was usually some change in the skin and hair over the part. The patient, whose photograph he presented, was a child two years old, of healthy appearance. The mother had given birth to two other children and they were normal. In the case presented the delivery was easy. The patient was breast-fed and got his first teeth when eleven months old. There were no symptoms of rickets and he was of fair intelligence and without any previous illness. The mother noticed shortly after birth that the child could not raise the arm above a right angle to the chest. Since then there has been no change. The flexion of elbow and wrist were normal. The muscles involved were the trapezius, the serratus magnus, the rhomboid and possibly the clavicular portion of the pectoralis major. There were no fibrillary twitchings, no trophic disturbances, and no other congenital defects. Dr. Herrman referred to the two sets of muscular defects, those which were unilateral, of which the pectoralis involvement was the type. In these cases there were trophic disturbances over the part affected. Usually there were other congenital anomalies. In the second set of cases of which the patient was an example, there were no other anomalies, and no trophic changes. These resembled the juvenile form of progressive muscular dystrophy (Erb). The important points which they had in common were:—

- (1) Bilateral, with involvement of the same sets of muscles.
- (2) The onset at a definite period of development.

- (3) The absence of trophic disturbances and other anomalies.
- (4) In a few cases congenital muscular defects have been followed by progressive muscular dystrophy.
- (5) Strumpell mentions a family, one member of which had progressive muscular dystrophy, another a congenital defect of the facial muscles.
- (6) Erb examined, microscopically, a case of muscular defect, and found pathologic changes similar to those of muscular dystrophy.

Dr. Herrman believed that these cases were possibly cases of muscular dystrophy which began in intrauterine life, with the process ceasing before birth.

A CASE OF HEMOPHILIA IN A GIRL OF ELEVEN YEARS.

DR. MATTHIAS NICOLL, JR., presented the patient whom he had had under observation since December, 1904. She was eleven years of age, and of German parentage. There were two other children in the family and both healthy; two other children had died of illness unassociated with hemophilia. There was no history of hemophilia in the mother's or father's family. The patient was breast-fed until eight months old. When six years of age it was noticed that following the slightest trauma certain spots of ecchymosis appeared. In January, 1904, she had a severe epistaxis which lasted for several hours; then there followed other attacks, at intervals of about one week, continuing often eight or nine hours and leaving the patient exsanguinated. These kept up for about three months. In December, 1904, she had an attack of so-called "brain fever" lasting one week, possibly due, he thought, to a cerebral hemorrhage. Five months ago the patient menstruated profusely, but it had not occurred since. She still had nose bleeds, but they were readily controlled by plugging and styptics. Following the extraction of a tooth she had vomiting of blood and profuse hemorrhage which lasted for several days; there was also a retinitis at the same time. When first seen the condition was the same as at present with the exception that she was much more anemic. The gums were like those of scurvy. There were petechiæ on pharynx, tonsils, the body and especially the shins, and several black and blue spots following traumatism. The coagulability of the blood was found to be slightly slower than normal. He believed this to be a dis-

ease of the blood vessels rather than of the blood itself. The interesting point about the case was that there was absolutely no history of any hereditary tendency. This disease occurred in females in only 10 per cent. of reported cases. In this girl symptoms did not appear until she was six years old. The urine contained some red blood cells.

DR. GEORGE H. BELL said that he had seen this case presented by Dr. Nicoll at Bellevue, and that she had poor vision, only $\frac{22}{100}$. She had had a hemorrhagic neuroretinitis. The hemorrhages were quite large. There was an extravasation of blood all over the retina, and it looked almost like a thrombus of the central vein. From time to time the patient got better and then got worse. The last time he had examined her there was a $\frac{20}{20}$ vision and the blood had been nearly all absorbed. One of the interesting points regarding this case was that it showed how easy the retina might become diseased when there was any condition that markedly altered the character or constituents of the blood.

DR. SARA WELT-KAKELS referred to the case of a boy eleven years old, one of nine children, in none of whom had there been any history of bleeding. This child had always been healthy, except for an attack of measles which was complicated by an attack of pneumonia. When six years old he began to bleed. At eight years he passed a basin full of bloody urine. He also bled from the nose and mouth. After the extraction of a tooth he bled for over fourteen hours. There had never been anything abnormal about the child except some enlargement of the lymphatic glands and tonsils. The body was simply covered with ecchymoses. If one pinched the skin, in a few minutes ecchymosis would appear at that point. The gums bled and looked like those of scurvy. Examination of the blood showed it to be normal. There was nothing found in the fundus of either eye.

DR. GEORGE D. SCOTT said that, although no specific history was present in this case, many of the cases of hemophilia he had seen were suspicious cases of syphilis acquired before birth.

A CASE OF CONGENITAL PULMONARY STENOSIS WITH NONCLOSURE OF THE FORAMEN OVALE AND DUCTUS ARTERIOSUS.

DR. F. L. WACHENHEIM presented this patient, aged two years. The lesion was discovered accidentally while going through a routine examination of the patient. The most in-

teresting thing about the case was that the patient was not at all cyanotic and there were no reasons to suspect any congenital heart lesion. There was a dullness which extended upwards and a systolic murmur over the pulmonary area which was transmitted upwards and to the left; indicating a stenosis at the pulmonary conus, an open foramen ovale and a nonclosure of the ductus arteriosus. There had been an entire absence of subjective symptoms.

DR. LA FÉTRA remarked that in his experience the majority of cases of congenital heart disease were without cyanosis, many of them being discovered, as was Dr. Wachenheim's case, only because of the routine examination. It was a mistake, in his opinion, to lay too great stress on cyanosis as a symptom, for many cases of even pulmonary stenosis are without cyanosis. As to the anatomical defects present in these cases, they are usually complex, and unfortunately deductions from the physical signs are frequently not borne out by the necropsy.

A CASE OF INTRAUTERINE AMPUTATIONS.

DR. WILLIAM L. STOWELL presented photographs of a boy twenty months old, who had been an abandoned infant and without history of birth. The case was reported in full, with reproductions of the photographs on page 342 of the current volume of ARCHIVES OF PEDIATRICS.

DR. ELISHA M. SILL reported an instance of the entire left hand missing in a little girl; there was a perfect amputation at the wrist.

THE FAT QUESTION IN ITS RELATION TO THE PRODUCTION OF INFANTILE MARASMUS.

DR. HEINRICH STERN read this paper, which is to be found in full on page 431, ARCHIVES OF PEDIATRICS for June.

DR. LOUIS FISCHER said he was very much interested in the question of fat feeding and especially in the etiology of athrepsia infantum. For many years he had seen instances of athrepsia infantum and he was not willing to say that all of them were due to excess of fat, to disturbances caused by the fatty acids, or chemical results of fat in the body but rather he would say that one factor in the cause of this condition was improper quantity or

quality of the fat. Most cases of athrepsia infantum he believed to be caused by faulty assimilation of the fat due to faulty hygiene as well as faulty feeding. The majority of these cases were due rather to disturbances following proteid feeding rather than to the fat. That certain chemical changes occurred in cow's milk which caused gastrointestinal changes, due to butyric acid, etc., was well known, this butyric acid being a forerunner of acetone. The form of disturbance of the gastrointestinal tract, due to excess of fat in the food, had even been noticed in breast-fed, as well as bottle-fed, children. He could recall several instances he had reported in which there was less than 1 per cent. of fat in the breast milk. Therefore, he believed that athrepsia infantum could be caused by a deficiency of fat in breast milk. In regard to the statement that the yolk of egg was better than properly modified cow's milk, he had given this some attention, using the yolk of egg in a great many cases where it seemed to be well borne; but in some of the patients gastrointestinal disturbances followed its use. With regard to the presence of fat in the feces being a guide to the assimilation of fat, he had examined a great many stools and found, that in most of the cases, a great deal of fat was excreted and some of the children did not gain in weight when a small amount of fat appeared in the stools. Dr. Fischer said he would not give the yolk of egg to children under six months of age, when they were suffering from severe gastrointestinal disturbances.

DR. LOUIS C. AGER said there were two ways of looking at this subject, one from the clinical standpoint. There were a large number of cases of so-called marasmus which were not inarasmus at all but simply cases of malnutrition, in which there would be rapid improvement on a proper diet. Then, again, there were a number of cases—which some believed to be due to an infection of some kind—which were strikingly cases of athrepsia or atrophy of certain parts of the intestinal canal; these latter cases would not recover under any kind of treatment. Theoretically feeding these children with the yolk of eggs seemed to him a good method, and it had just occurred to him that it might be combined in some instances with the buttermilk feeding used so extensively in France. But if one turned to a consideration of the subject from the pathologic findings, yolk feeding did not seem to be so encouraging an idea. He said some excellent work on the chemical

pathology of this subject had been done especially in Germany, where there are two opposing views as to the meaning of the chemical findings. In this country, Koplik and Chapin have assumed that Keller and the Breslau school are correct in saying that this athrepsia is due to an acid autointoxication. On the other hand, Steinitz and others in Graz have shown pretty conclusively that this is not an acid intoxication, at least in the ordinary sense. There is undoubtedly a large increase in the nitrogen of ammonia in the urine indicating some disturbance in liver metabolism. According to Herter this marked increase of the nitrogen of ammonia is equivalent to acid intoxication. But Dr. Ager said we did not have the ordinary disturbances which were due to acetone or diacetic acid which we got in true acid intoxication, as in diabetes. Owing to the disturbed liver function there is a diminution in the secretion of bile; and particularly considerable diminution in the secretion of lecithin in the bile. If the organism was excreting less lecithin than normal he saw no reason for giving more in egg yolks.

DR. T. S. SOUTHWORTH said he was not so pessimistic regarding marasmus as Dr. Stern was. He saw distinctly less of these cases today than formerly and he believed it was due to a better milk supply in this region. He did not agree entirely regarding the uselessness of adopting certain measures of feeding in marasmus cases, because very much could be done by careful feeding. He had never thought that fat was a causative factor in the production of marasmus. Sometimes one saw cases of marasmus caused by too strong milk mixtures, and it was often produced, perhaps, by too frequent changes from one proprietary food to another, and these are notoriously deficient in fat. He asked Dr. Stern how much volatile fat he had stated was to be found in cow's milk.

DR. STERN said that he had been mistaken in reading 70 per cent.; the figures should have been 7 per cent.

DR. SOUTHWORTH said he was surprised to hear that statement, because the dairy experts in this country gave the amount as being 8 per cent. He said that Dr. Stern was presenting a new theory and he thought all should be open-minded and consider it before passing final judgment upon it. He said he had found great difficulty in getting children to take the yolk of egg; it seemed to cause gastric disturbance and vomiting. He was not

so much opposed to giving the white of egg as Dr. Stern; he had used it in the food of marasmic infants without the yolk; this gave satisfactory results for limited periods, although he realized the white of egg did not contain all the proteid elements for continual use. He did not believe that all the blame should be laid on milk fat in these cases; in many of them the absorption of fat was poor, and what they needed was stimulation of the processes of assimilation. It was not so much gastric digestion as it was intestinal assimilation which was at fault.

DR. L. E. LA FÉTRA said that, some years ago, his attention had been called to the use of the yolk of egg, and especially its subcutaneous injection, as had been described in the French journals. At that time he had a number of these marasmus cases under his care and he began this treatment, but without much success. He tried the use of the yolk of eggs at the Nursery and Child's Hospital, but he regretted to say that, in all probability, some of them were from "cold-storage" eggs, for in some instances there occurred abscess formation. He then began to use the yolks by mouth mixed with orange juice, giving the mixture every four or five hours, and he said that there was much to say favoring it. In those cases where the child could not take the yolk of the egg raw, he cooked it to a powder and then it was taken without disturbance. He called attention to the fact that the iron content of the yolk of the egg was of advantage. In cases of marasmus the absorption of fat was very difficult; these children had fatty livers, their livers being large and greasy. Dr. La Fétra thought that Dr. Stern's paper was a very suggestive one. In regard to the causation of marasmus he was not inclined to attribute it to fat; there was difficulty in absorption of fat after marasmus began. If one could have the yolk of the eggs absorbed we then had a blood maker which would be of inestimable value in these marantic cases.

DR. HEINRICH STERN closed the discussion by saying that he took particular pains not to be understood that infantile marasmus or other forms of underalimentation are always the result of faulty fat supply. This is certainly not the case. However, there is a class of infantile malnutrition which is certainly due to, or aggravated by, the ingestion of the fat of cow's milk. Instances of malnutrition, due to non-absorption of fats or to intestinal irritation, called forth by volatile fatty acids or aggravated

by the latter, are generally referred to the proteid or carbohydrate contents of the milk, or to its biologic unfitness. Hardly ever was the chemical composition of the fat supply deemed the cause of the intestinal disorder and the subsequent bodily deterioration. By substituting in the suitable cases the yolk of the egg for the fat-compound of changeable character called "cream," we obtain a nutriment almost totally devoid of the irritating, poisonous volatile fatty acids, a nutriment which could well serve as a physiologic substitute of mother's milk. It is, however, imperative to remove the entire fat from the milk before the yolk is added. In other words, we must try to obtain at first the skim milk. This may be modified according to the individual preferences of the clinician. The yolk-fat may be added in the desired percentage equivalent of the cream. The yolk-fat may be started in very small amounts and may be increased gradually. He had never seen it produce any gastrointestinal disturbance when all the milk-fat had been previously removed. Academically speaking, all the milk-fat can never be removed, as a small proportion of it continues to float in the milk. Skimmed milk is never without some small amount of fat.

The autointoxications during infantile life are probably merely toxicoses due to pathologic disintegration of the ingesta. We cannot, therefore, speak of an acidosis, but of an enterogenous acid intoxication. These acids are introduced in the preformed state and are not generated by the cellular activity of the organism. Statistics of cases treated by the method as advocated by the speaker will come forth later.

IMPORTANT DIFFERENTIAL POINTS IN THE DIAGNOSIS OF SPORADIC
CRETINISM, MONGOLISM, ACHONDROPLASIA AND RACHITIS.

DR. CHARLES HERRMAN read this paper, which will be found on page 493 of this number of ARCHIVES OF PEDIATRICS. It was discussed in part by Dr. Nathan and Dr. L. Pierce Clark, the latter showing photographs of some ancient historical monstrosities.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, April 11, 1905.

DR. JAMES H. MCKEE, PRESIDENT.

CEREBELLAR TUMOR.

DR. CHARLES F. JUDSON presented this patient, showing the characteristic symptoms of cerebellar tumor. G. T., of Irish parentage, seven years old, male, two months after a mild attack of scarlatina in August, 1903, developed the typical picture of brain tumor involving the posterior fossa, nausea and vomiting, headache, vertigo, staggering gait, failing eyesight, etc. On admission to the hospital in September, 1904, he could stand only with feet widely separated. In walking toward an object he deviated to the right or left, rotation of the body caused marked vertigo, but there was no ataxia in the recumbent position. His knee-jerks were increased on both sides, especially the right, the Babinski reflex was present; there was no ankle clonus. The mind was clear and the memory good; muscular power was not impaired; the cranial nerves were not involved with the exception of the optic. Vision was markedly reduced, double choked disc with beginning atrophy and small retinal hemorrhages being found. No real nystagmus existed, but the eye muscles were paretic on executing extreme movements. Stereognosis was normal, as was the muscular sense. As presented to the Society, the boy was markedly paretic, both lower extremities were moved with extreme difficulty, the right scarcely at all; the upper extremities were less involved, as were also the muscles of the trunk, and here again the right side of the body and right arm had suffered most. The grip of the right hand was feeble, that of the left hand fair. Spastic rigidity was noticed in both legs and the right arm, and a coarse tremor followed on attempts to grasp objects with the right hand. Extreme deviation of the eyes resulted in coarse, oscillatory nystagmoid movements. The pupils were dilated, but responded to light and accommodation. Vision in the right eye was almost gone. There were incontinence of urine and feces, marked vasomotor disturbances, rapid pulse and

respiration and extreme hebetude. The interesting points in this case were the long duration and gradual course of the disease, and the absence of any definite localizing symptoms such as might have warranted surgical interference, while typical symptoms of brain tumor had been present at a very early stage. From the boy's appearance and family history it seemed likely that the growth is tubercular.

A CASE OF CHYLIFORM EFFUSION INTO THE LEFT PLEURA AND
HODGKIN'S DISEASE.

DR. D. J. MILTON MILLER exhibited this patient, a boy of eleven years. The course had been quite rapid; the enlarged glands were first observed fifteen months ago (December, 1903), and had so grown in seven months that they were removed last July, 1904, at the Jefferson College Hospital. Dr. Coplin reported the histology as essentially that of Hodgkin's disease, namely: increased lymphadenoid tissue; proliferation of endothelioid cells; presence of uninuclear and multinuclear giant cells; thickening of reticulum; eosinophiles in moderate numbers; no tubercle bacilli. Shortly after this the glands again enlarged; now on both sides of the neck. The abdomen and feet also began to swell, so that the boy could not get about. This caused his admission to hospital six weeks ago. He presented then practically the same conditions that he does now. There is a mass of enlarged glands on the left side of the neck, and a similar enlargement, although to a less degree, on the right side posteriorly; the axillary and inguinal glands are slightly enlarged. The abdomen contains fluid, and its superficial veins are prominent; the liver and spleen are enlarged. The superficial thoracic veins are distended, especially on the left side, and appear to anastomose with those of the abdomen. On admission there was some fluid in the left pleura. This increased rapidly, and was removed by aspiration on March 4th, and again, because of reaccumulation, on April 6th. The fluid withdrawn was peculiar, resembling skimmed milk (chylous or chyliform). It contained albumin (decided reaction); a trace of sugar; a specific gravity of 1009-12; of alkaline reaction; the cellular elements composed almost entirely of lymphocytes, with a few polynuclears and red blood cells; fat, in small amount, chemically, but not microscopically; cultures and smears sterile. Because of the displaced medi-

astinum (from the effusion), dullness cannot be demonstrated in the upper sternum or in the interscapular space, nor does the x-ray reveal the presence of a growth in the mediastinum. The urine contains a trace of albumin; a few hyaline casts; no sugar. Several blood counts have been made; the red cells average 4,000,000, the whites 10,000 to 14,000, the hemoglobin 60-70 per cent.; differential count, 90 per cent. polynuclears, 2 per cent. small lymphocytes, 2 per cent. large lymphocytes, 0.5 per cent. eosinophiles. Fever has been almost constant (102-3° F.). The patient is anemic, and the legs and scrotum edematous. He is weak and losing ground and is probably destined not to live much longer.

The diagnosis, Dr. Miller said, was undoubted, viz., Hodgkin's disease, and of a rapid, and, apparently, fatal type. In presenting a case of Hodgkin's disease to the Society three years ago, Dr. Miller maintained that the affection had a definite clinical picture and course, quite different from that of lymphatic tuberculosis, and was a distinct clinical entity; and now Reed, Longcope and Simmons have shown that it has, also, a definite pathological picture, and is a distinct pathological entity. Dr. Miller referred to the large number of lymphocytes in the pleural fluid, as a possible indication of a secondary tuberculous infection; a not uncommon end in Hodgkin's disease. Of very great interest was the chyliform pleural effusion, as the milky appearance was not due to genuine chyle, although its presence could not be absolutely excluded. Effusions of this nature are rare, and are usually divided into chylous and chyliform fluids, or those in which the opalescence is due to admixture of chyle, and those in which it is caused by fatty degeneration of endothelial and epithelial cells; in both cases the fluid is essentially a fatty emulsion. In some cases, however, fat cannot be demonstrated, or is present in too small quantity to form an emulsion, and the milky appearance of the fluid is attributed to globulin, or some form of altered albumin. This, Dr. Miller thought, to be the explanation of the color in his case. The effusion contained but a small amount of fat, only 0.2 per cent., according to Dr. Edsall, who had examined the fluid. Dr. Edsall did not think that agitation with ether had any appreciable effect, but Dr. Coplin found that it cleared the fluid slightly. The latter, also, ascertained that, on treating the sediment (centrifugated) with osmic acid, a small amount of molecular fat could be demonstrated. On the

other hand, careful microscopic examination failed absolutely to discover fat, and Dr. Edsall could separate but 0.2 per cent., and, in addition, on precipitating out the albumin, found that the opalescence disappeared entirely; hence, he concluded that the milky color was probably due to altered albumin in some form, or in some peculiar combination. The majority of chyliform effusions are associated with neoplasms, and the case presented did not depart from the rule, in that there was probably a growth (lymphadenoma) in the mediastinum or pleura.

SURGICAL NOTE BY
DR. JOPSON.

The patient was transferred to the surgical ward on the 4th of March, the day following that on which we had succeeded in aspirating the encysted collection. Operation the same day. The diagnosis was em-



CASE OF HODGKIN'S DISEASE WITH CHYLIFORM
EFFUSION INTO LEFT PLEURAL CAVITY.

pyemia, and no suspicion of an interlobular collection was entertained. The patient's condition was poor; she was exhausted by her long illness, was emaciated, and looked septic. She took ether well. Aspiration in the seventh interspace, posterior axillary line yielded pus. The incision opened the pleura at this point, the centre of the incision corresponding to the posterior axillary line. There were universal light adhesions binding together the parietal and visceral layers of the pleura, and obliterating its

cavity, but no fluid was found, and after separating adhesions for an area of about six inches around the wound no collection was encountered. As we were close to the dome of the diaphragm at this point, and as pus had been withdrawn by deep puncture before incision, we concluded that the diagnosis now lay between an abscess of the lung and a subphrenic collection pushing up the diaphragm. At a deeper level the aspirating needle was introduced through the lung and pus again found in an upward and backward direction. Two inches of the seventh rib were resected, the lung stitched to the chest wall around the edges of the wound, the needle again introduced into the abscess cavity, followed successively by a grooved director, hemostatic forceps, and the finger, and a large cavity discovered in the posterior portion of the thorax, bounded in front and to the outer side by lung tissue, and posteriorly approaching near the chest wall. Whether any compressed lung tissue intervened between the cavity and the parietal pleura at this point could not be determined. The pleural cavity, anterior to the incision, was packed off with gauze strips, and two rubber drainage tubes of good calibre were inserted into the abscess cavity. After operation the patient reacted nicely under free stimulation. The abscess cavity drained freely. The temperature continued moderately elevated for about six days, when it began to touch normal in the mornings. There was some evening rise, and occasionally slight elevations for several weeks longer, the wound continuing to discharge in decreasing quantity. The tubes were kept in situ for several weeks, being finally removed on April 12th, when the discharge was slight in amount, and thereafter the cavity was drained by a gauze strip. At this time (May) there is a small sinus several inches in length still present, which will probably be some weeks longer in closing. The patient has gained at least twenty pounds in weight, the temperature has been normal for a month, and she seems to be in perfect health.

HODGKIN'S DISEASE.

DR. SAMUEL McC. HAMILL presented two patients; the first being a boy (P.J.), aged six years, whose family and previous history were good. The disease was of three years' duration, and first manifested itself by the appearance of a small lump just beneath the mastoid process on the left side. Since its beginning, it has persistently increased in size until it is now about as large as a hen's egg. Gradually most of the glands of the deep cervical

chain on the left side have become enlarged, and a few of the post cervical glands on the same side have reached the size of a pigeon's egg. One of the deep cervical glands immediately above the clavicle has attained the volume of a large walnut.

The development has been gradual and persistent. The glands have never temporarily decreased in volume and there has never been any tendency to suppuration. They have never been painful or tender.

The boy's general health has been excellent. He was presented for treatment with the hope of having the glands removed, in order to improve his appearance. He was not thought to have been feverish. Physical examination showed him to be a well nourished child, with moderate anemia, the blood examination showing 70 per cent. of hemoglobin (Fleischl); 4,090,000 erythrocytes; 8,600 leukocytes. The differential count of the white cells showed:

Polymorphonuclears	53.6	per cent.
Small mononuclears	39.6	" "
Large mononuclears	2.4	" "
Basophiles	0.8	" "
Transitionals	3.6	" "

Careful examination revealed no enlargement of any of the other superficial glands of the body, and no evidence of enlargement of the mediastinal or retroperitoneal glands. The spleen was not palpable; the liver extended two fingers' breadth below the costal margin. On the several occasions on which he had been seen in the dispensary, at the Howard Hospital, his mouth temperature had been between 99° and 100° F.

The second case was (V. S.) a boy of eleven years, whose family history was good, and whose previous history included an attack of measles at the age of two years and scarlet fever at three years. Aside from this, his health was excellent until the beginning of the present trouble.

Three and a half years ago, there was noticed a swelling the size of a marble in the same position as that indicated in the previous case, which gradually increased in size, together with a varying degree of involvement of all of the deep cervical chain and a few of the post cervical glands.

The gland first involved, with one other, was removed for

histological examination in January of 1904, whilst the patient was under the care of Dr. Scott in the Pennsylvania Hospital. During his stay there he was treated by the x-ray, with a primarily gratifying result, the glandular enlargement disappearing almost entirely. During the continuation of the treatment the enlargement recurred and has been persistent since that time. One gland in about the middle of the sterno-cleido-mastoid has reached the size of an unhulled walnut, and between this and the cervical, and evidently more deeply situated, there is one gland the size of a small hen's egg.

About two years ago the boy began to cough. The cough soon became paroxysmal, worse at night, and sometimes attended by vomiting. It is laryngeal in type and rarely attended by expectoration. On several occasions there has been a slight diminution of the coughing.

With the initiation of the cough he began to grow pale and lose flesh. His parents have recognized that he has been feverish at times, and more especially when his cough has been most severe. For some months past he has suffered from dyspnea on exertion. He has never been edematous, and his general health has been good. He has never suffered pain in any part of his body, nor have the glands been tender.

The physical examination showed the glands in the neck as noted above. In addition, there exists a marked fulness in the veins of the upper part of the chest, extending slightly to the right, but much more evident on the left side, and involving the left shoulder. The sub-, as well as the supra-clavicular, fossa on the left side is fuller than on the right. The left forearm and hand are larger than the right. There is more marked congestion on the left hand and forearm than on the right, and the superficial temperature is lower on this side and the volume of the pulse much lessened. There is an area of dullness over the upper parts of the chest, extending on the right almost to the midclavicular line, and downward and inward to the third costal cartilage and to the midclavicular line on the left, being bounded on the top by the upper part of the sternum. Aside from a harsh, inspiratory murmur on both sides, there are no changes in the lung. There is no effusion in the pleural cavities; the heart is not abnormal.

The spleen is very much enlarged, extending to the transverse umbilical line and to the median line on the right. The upper

border of splenic dullness extends to the sixth left space in the mid-axillary region.

The liver is felt an inch below the costal margin in the extension of the midclavicular line. Its upper border of deep dullness begins at the third rib in this line, anterior axillary line at the fourth rib, the posterior axillary at the sixth rib and just to the right of the vertebral column in the eighth interspace.

There is no enlargement of the other superficial glands, nor evidences of enlargement of any of the abdominal glands. The boy is decidedly anemic.

A blood examination, made by Dr. Longcope on the 26th of January, 1904, when the patient was in the Pennsylvania Hospital, resulted as follows:

Erythrocytes	6,280,000
Leukocytes	10,900
Hemoglobin	90 per cent.

Differential Count.

Polymorphonuclear leukocytes..	81.0	per cent.
Large mononuclears	17.5	" "
Small mononuclears	0.5	" "
Eosinophiles	0.5	" "
Transitionals	0.5	" "
<hr/>		
		100.0

A blood examination made the 16th of March this year at the Polyclinic Hospital, showed:

Hemoglobin	65	per cent.
Red blood corpuscles	3,700,000	
White blood corpuscles	6,400	
Polymorphonuclears	56.4	per cent.
Lymphocytes	34.0	" "
Transitionals	0.8	" "
Eosinophiles	8.8	" "

The latter finding, if proven to be correct, shows a remarkable number of eosinophiles, a condition which would prove unique and interesting in the light of the great abundance of eosinophiles

which are found in the glandular enlargements as well as in the bone marrow. The examination also marks a very decided increase in the anemia since the original examination by Dr. Longcope.

During the time that this boy has been under observation, there has been a persistent slight elevation of temperature, the highest record being 100.5°F.

Through the courtesy of Dr. Longcope, I have been enabled to submit his report upon the microscopic examination of the glands removed, the principal features of which are the almost complete destruction of the normal structure of the gland, increase in the lymphoid elements in certain areas, the proliferation of the endothelioid cells, the presence of uninuclear and multinuclear giant cells, eosinophiles in great profusion, thickening of the reticulum and overgrowth of the connective tissue.

Dr. Longcope had been very much interested in this boy because he had been under x-ray treatment. In a number of cases he had had an opportunity of studying the glands both before and after treatment with the x-ray, especially in a fatal case in which all the glands were examined. As the glands became smaller there was a distinct degeneration of the cellular elements. There was an overgrowth of connective tissue with a hyaline degeneration, only a few islands of cellular tissue remaining. This is the principal effect of the x-ray upon the glands. He doubted the possibility of securing permanent results from this form of treatment, for he had noticed that, even in patients in whom the glands were much reduced in size, if treatment were suspended for several weeks, the glands invariably became enlarged again.

DR. GRAHAM thought it a special privilege to be allowed to see 3 cases of Hodgkin's disease in one evening. All these cases showed marked cervical enlargement, but very little enlargement of the axillary glands. He thought that the general opinion at present is that these cases are nontubercular. He mentioned a case that he had observed about a year and a half ago, in which the cervical, axillary and abdominal glands were much enlarged. The glands were studied during life with the idea, if possible, of determining whether they were tubercular. The histologic appearances were those usually described in Hodgkin's disease, and, furthermore, guinea-pig inoculation was negative. Postmortem all the glands were carefully studied, but no evidences of tuberculosis were found. Dr. Graham considered Hodgkin's disease an

entity absolutely distinct from tuberculosis, and thought that the two diseases had been confused for the reason that many cases of tuberculosis of the glands had been called Hodgkin's disease.

DR. HAMILL asked Dr. Longcope if it was likely that as high a percentage of eosinophiles should occur as was indicated in the blood examination of one of the cases shown. He said that he was aware of the fact that the percentage of eosinophiles in the blood was ordinarily extremely low, whilst they were present in great profusion in the glands.

DR. LONGCOPE, in answer to Dr. Hamill's question, said that it is very unusual to have an eosinophilia associated with Hodgkin's disease. In fact, he was not aware that any case had been reported in which the percentage of eosinophiles was increased in the blood. It would, however, not be surprising if such a condition were found, since, in the lymph nodes these cells so often occur in great numbers.

DR. MILLER said that he had forgotten to mention the most interesting feature of his case, viz., the treatment. The boy had been under treatment with the x-ray for six weeks, but there had been no appreciable improvement in the condition.

DR. HAMILL showed a case of

AMAUROTIC FAMILY IDIOCY.

The patient was a female child of Jewish parentage, aged twenty-two months. Her parents are living and well, and they were not related before marriage. The only other child born to them died at the age of thirteen months in a convulsive seizure, occurring in the course of an illness of two days' duration. Prior to this, however, it was known to have had "stomach trouble."

A maternal uncle, aged twenty years, had had a nervous disorder, which had incapacitated him for walking for the past six years.

The child had had no illness other than the present. It was breast-fed for thirteen months, cow's milk being added to the diet at the age of seven months. Since the end of the first year she had received, additionally, eggs, and, occasionally, tea.

Present History.—The child was perfectly well until six months old. She then became very constipated, vomiting occasionally, lost some flesh, and grew gradually weaker. At the beginning of this trouble it was noted that she was unable to hold

her head up as well as she had formerly done. She has never been able to sit alone, but she came nearer to it prior to the sixth month than since then. Until she was one year old, she was able to see and would pick up objects placed near her. Since then she has ceased to notice objects, which her parents have attributed to defective mental development. It has also been noted that, coincident with this indifference to objects placed about her, her intelligence decreased, and the arms and legs, which had been formerly more or less flaccid, became spastic. The mother states that, recently, she has had attacks of extreme rigidity, which persisted unaltered for periods of one hour. The spasticity is not constant; there is frequently a momentary relaxation of one or two members. Sometimes the rigidity occurs so suddenly that the leg or arm is thrown into a state of spasm. The mother has never noticed any involvement of the muscles of the face, neck and trunk. She has attacks of laughing, which come on with marked suddenness and without cause, sometimes continuing for ten or fifteen minutes ("explosive laughter"). She has always had some cough, which has been worse the past few days, and seems to be the result of a tendency to choke. She has some difficulty in swallowing, and recently has refused all food except milk.

There is some redness and swelling of the gums, a moderate amount of redness of all of the mucous membranes of the mouth and marked salivation; no bleeding. She is supposed to be feverish quite frequently. Her bowels are persistently constipated, being moved with difficulty ever since the illness began. Her hearing is good and she is very much startled by sudden sounds.

The main features at the examination are a peculiar blank expression, dribbling of saliva, falling forward of the head, spasticity of the arms and legs, which can be readily temporarily overcome by resistance; some rigidity of the muscles of the back of the neck, marked increase in the knee jerk and the plantar reflex, marked hyperesthesia on the arms, and especially the legs, persistent extreme extension of the great toes and flexion of the small toes, a peculiarly shaped head—rather narrow anteriorly, broad in the biparietal diameter, flat in the occipital region, producing a triangular shaped cranium and an anterior fontanel, which is about 1x1 inch in diameter.

Dr. Posey, by whom the eye examination was made, reported that the typical lesion of amaurotic family idiocy was present. His detailed report had not been submitted.

DR. HAMILL said that this condition is evidently becoming more commonly recognized than formerly. Within the past two years, he had had 3 cases under his care and had knowledge of several others.

This increased frequency makes them less interesting from a clinical standpoint, whilst the difficulty in securing autopsies, on account of the race prejudice, continues our interest in their pathology.

The widespread degeneration of the ganglion cells of the brain and cord, first observed by Hirsh, have been confirmed by Sachs and Spiller. The same lesions have been described by Spiller and others in other conditions. It is questionable, therefore, whether these findings should be considered characteristic. There is probably some other factor, as yet unrecognized, which must be developed in order to account for this distinctive symptom complex.

TWO CASES EXHIBITING NERVOUS SEQUELÆ OF SCARLET FEVER.

DR. MILLICENT HOPKINS presented these patients. The first was a boy of four years, of Italian parents. The father and mother are living and in good health. There are four other children, all well; one died at ten months of hemorrhage. This child was well until two years old, when he contracted scarlet fever. During the course of the disease he had a very severe convulsion, and later the mother noticed a paralysis of the right leg, right arm and right side of the face.

Examination by Dr. Spiller was as follows: The right lower limb is flaccid and smaller than the left; there is no ankle clonus; the right patellar reflex is lost, while on the left side it is increased; there is no Babin'ski reflex on either side. The gluteal fold of the right side is obliterated; sensation is normal. The upper limbs are well developed, the right being a little smaller than the left. There is no distinct facial palsy. There is no response to the faradic current from the anterior tibial muscle, and but slight contraction of the long extensor, on the right side.

Diagnosis.—Anterior poliomyelitis, probably with some encephalitis, the result of scarlet fever.

The second patient was a girl of fifteen years, born in Russia. Both parents are living and well. This girl had always been in good health until an attack of scarlet fever at seven years of age.

During the illness a convulsion occurred which left a right hemiplegia. The mother tells particularly of the slow return of speech. There is spasticity of the right arm and leg, more marked in the arm. The patellar reflex of the right side is diminished. There is a slight Babinski reflex on the right side. There is wasting with marked contracture of the right arm, and this member can be raised only to a right angle with the body. There is mental impairment.

Diagnosis.—Hemiplegia, either from hemorrhage or encephalitis, the result of scarlet fever.

DR. GRIFFITH said that within a year he had had occasion to look up some of the journal literature pertaining to scarlet fever, and that he had been impressed with the scantiness of reference to nervous lesions accompanying or following the disease. The 2 cases shown this evening possessed, therefore, a special interest. They were certainly very unusual.

DR. McKEE thought that the cord case was most remarkable. He had consulted several authorities upon the subject, but could find no references to such cord lesions complicating scarlet fever.

DR. MILLER thought that cases of this sort must be very rare. He remembered in reading Meigs and Pepper's "Diseases of Children," the report of a case of general paralysis developing during scarlet fever. The patient was about a year recovering. The condition was probably a multiple neuritis; although the authors did not so state. This was the only instance of paralysis following scarlet fever that they had seen in their enormous experience.

DR. EDWIN E. GRAHAM reported a

CASE OF RHEUMATIC ENDOCARDITIS ENDING FATALLY.

The full report of this case will be found on page 523 of this issue of ARCHIVES OF PEDIATRICS.

DR. MILLER asked Dr. Graham what he considered the cause of death in this case, and, also, whether there had been tonsilitis preceding the rheumatic attack. He thought that in many cases of rheumatism and endocarditis the infection was introduced through the tonsils. He, also, was inclined to question Dr. Graham's conception of his case as one of simple endocarditis. The child was seriously ill, and the case ended fatally, after a brief

illness; events of infrequent occurrence in simple endocarditis. Without blood examinations during life, and microscopical and bacteriological examinations after death, it was not possible to say that any given case belonged to the simple or the so-called ulcerative (infective) variety of endocarditis, especially when a case terminated fatally, as this one had done.

DR. ROUSSEL thought that occasionally in rheumatism the heart manifestations precede the articular symptoms. He mentioned the case of a child of six years, who, several days after an ordinary attack of tonsilitis, developed endocarditis. Subsequently, the articular symptoms of rheumatism were observed. He quoted the late Dr. Packard's writings upon tonsilitis as the source of infection in endocarditis.

DR. MCKEE mentioned a case which first came under observation with a follicular tonsilitis. This was followed several days later by an erythema multiforme, fever and signs of an endocarditis. Under treatment with the salicylates, the temperature became normal, and the eruption disappeared. The patient finally developed pericarditis and myocarditis and died.

DR. GRAHAM said that there had been no tonsilitis in this case, and no history of any infectious disease. He felt confident that it was a case of simple endocarditis, as there had been no chills or septic temperature. Death was very sudden. The child awoke terrified from a dream and died within a few minutes.

A BRIEF NOTE CONCERNING THE EXPRESSION OF THE MILK FORMULA.

DR. J. H. MCKEE spoke of mathematical formulæ as representing a universal language. The more graphic a formula is, the more clearly it speaks. He contended that milk formula might be made more graphic. Instead of expressing a formula—fat, 3 per cent.; milk sugar, 6 per cent., and proteid, 1 per cent.—it would be better to say: Proteid, 1 per cent.; fat, 3 per cent., and milk sugar, 6 per cent. The latter order possesses the following advantages over the former: (1) It follows physiologic custom; as in the expression of the "normal" or "average diet" of the adult. (2) It expresses these organic constituents in the order of their metabolic values. (3) It expresses the order in which these groups are liable to cause digestive disturbances. (4) It

expresses their quantitative ratios, one to another, in natural sequence.

DR. GRAHAM thought that if an effort were made, Dr. McKee's suggestion would probably be taken up. Of course, it would be difficult to depart from a method which custom has made familiar.

Tetanus.—Schley reports (*Medical Record*, October 15, 1904) 1 case of tetanus treated by Rogers's method of intraneural injections of antitoxin. The patient recovered. To date 4 cases have been treated by this method with four recoveries: One of these cases was reported by Meyer and Ransom; and two were reported by Rogers and the author. A temperature chart of the first eight days is appended and marked with the quantity, time, and site of the antitoxin injections. The value of the intraneural and intraspinal injections over the subcutaneous administration is well shown in the temperature curve and pulse record.—*New York and Philadelphia Medical Journal*.

An Unusual Variety of Pleurisy in Children.—C. Rivière (*The Practitioner*, September, 1904) reports 6 cases of loculated pleurisy occurring over the middle lobe, not secondary to pneumonia, which is a condition hitherto undescribed. Its special claim to recognition rests on the fact that it so closely simulates by its signs other pathologic changes occurring in the same situation in children. The onset and general symptoms are those commonly found in primary pleurisies of children, the physical signs later localizing the effusion. The condition is liable to be confused with cardiac enlargement, empyema, collapse of the middle lobe, or fibrosis and bronchiectasis of the middle lobe. In none of the cases reported was the diagnosis confirmed by the use of the aspirating needle, that expedient not appearing justifiable.—*American Medicine*.

Current Literature.

MEDICINE.

Pick, James: Nephritis in Infancy Occurring as a Complication of Intestinal Disease. (*Jahr. für Kinderh.*, Vol. XL., 1905, pp. 290.)

During the past thirty years nephritis as a special complication of intestinal disease has engaged attention.

Literature contains numerous and somewhat conflicting descriptions of this condition.

The writer reviews the literature of the subject and gives the result of his study of cases from a pathological and anatomical, as well as from a clinical standpoint.

Summing up the anatomical findings briefly: Fatty degeneration of the epithelium of the straight, as well as of the convoluted, tubules, is found in cholera infantum. In many places there is necrosis of the lining epithelium of the convoluted tubules; congestion of the capillaries and larger blood vessels is marked.

Recent interstitial inflammation, chiefly subcortical, is found in some areas. Thirty-six cases were observed by Pick, and these he classes as follows: Dyspepsia, 2; acute intestinal catarrh, 3; cholera infantum, 23; sub-acute intestinal catarrh, 4; chronic intestinal catarrh, 4.

In most cases the urine was obtained by means of a sterile metal catheter.

In the cases of dyspepsia the urine was scanty, dark, slightly cloudy and strongly acid. In one case there was much albumin, in the other, only a trace.

The sediment of the specimen which contained much albumin showed many granular casts and renal epithelium. In the urine sediment of the other case there were a few hyaline casts. The urine in the cases of acute intestinal catarrh was copious in one instance and below normal in the other; it was light yellow, cloudy, and of acid reaction; albumin in one case was slight in amount; in two there was a moderate quantity of albumin; granular casts were found in all the specimens; in the urine of one patient there were red blood cells. The urine obtained from cases of cholera infantum was usually scant and cloudy—it was light yellow or dark and acid; albumin was present in large amount as a rule; at times a trace was found. Microscopically there were hyaline and granular casts, renal and bladder epithelium, leukocytes and red blood cells; also bacteria, oil globules and uric acid crystals.

The symptoms indicating nephritis may be described as fol-

lows: The course of the renal inflammation in these cases is not strikingly evident. Most often strict observation is required to recognize the condition.

As to the etiology of this form of nephritis, all the authors except Simmons agree that it is the result of the intestinal disease, and this view is shared by Pick.

Examination of the urine points clearly to nephritis. Further symptoms noted are oedema and uremia.

As regards the duration of the nephritis, the writer agrees with Moser and Czerny in thinking that it may outlast the intestinal disease.

Takasu, K.: The Blood of Infants and Adults Afflicted with Kakke. (*Jahr. für Kinderh.*, Vol. XL., 1905, pp. 275.)

Since the Japanese disease kakke (beri beri) was brought to the notice of Europeans in 1878 by Wernich, a large number of scientific articles have been contributed upon the subject. Many of them refer to the blood in this disease.

During two years the writer made blood examinations in cases of infants and adults suffering from kakke in the hospital at Osaka.

Dried blood films were stained with Ehrlich's triple stain. The results are tabulated.

The blood of thirty-eight infants who, together with their mothers suffered from kakke, was examined. The percentage of hemoglobin in 15 cases was from 55 to 100—mostly more than 85. The red cells in 21 cases numbered 2,830,000, mainly over 3,500,000.

The leukocytes in 20 cases numbered 8,500 to 34,000, but in most cases exceeded 11,000. Nucleated red cells were present in 19 grave, acute cases. In most chronic cases the number of lymphocytes was increased.

Comparing his results with those obtained previously in connection with work done upon the blood of Japanese children, the writer draws the following conclusions:

1. Kakke in infants causes a decrease in the amount of hemoglobin as well as in the number of erythrocytes.
2. In acute and severe cases of kakke in infants nucleated erythrocytes occur.
3. In the chronic atrophic form of infantile kakke the number of lymphocytes is increased.

The same changes occur in the blood of adults suffering from this disease.

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Original Communications.

ACID AUTOINTOXICATION IN INFANCY AND CHILDHOOD.*

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Vicarelli (1895) examined the urine of thirty perfectly healthy infants under six months for acetone. The distillate of the twenty-four hour amount was almost always positive by the iodoform test, but negative with sodium nitroprussid and oxalate of mercury. He concluded that the urine of healthy sucklings does not contain acetone. Baginsky (1888) found that acetone was present in the urine of healthy children under apparently entirely normal conditions, but only in very small quantities; while Langstein and Meyer (1905) found that the normal excretion in twenty-four hours never exceeded 1 cgm. Schrack (1889) says that the urine of children often contains small amounts of acetone from very insignificant causes. Brackett, Stone and Low, however, found acetone in only eleven of 300 surgical cases at the Boston Children's Hospital. In them it was associated with more or less severe symptoms. Langstein and Meyer (1905) found that when children from six to fourteen years of age received a meat diet without carbohydrates relatively more acetone was excreted than in adults. They also found that the principal part of the acetone was excreted through the lungs, and not through the urine as in adults. They always found diacetic and B-oxybutyric acid in considerable amounts. The organism of the child invariably reacted to the acidosis in the body by an increase

* Read before the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 19, 1905.

in the excretion of ammonia. Camerer (1903) states that the nitrogen of ammonia in infancy is unexpectedly high.

The work of von Jaksch (1886) on acetonuria and diaceturia inspired Baginsky (1888) to study acetonuria in children. Schrack (1889) in the next year examined the urine of 400 children for acetone and diacetic acid. Their results and those of others, Bottazzi (1901), Freund (1903), Bernert (1904), Meyer (1904), in smaller series of cases, including one of 150 of my own, tested for both acetone and diacetic acid by the sodium nitroprussid and ferric chlorid tests, apparently show that the acid bodies are present in the urine of infants and children under approximately the same conditions as in adults. They are often present in acute diseases accompanied by high fever (especially in the acute exanthemata, diphtheria and pneumonia), vary, as a rule, directly with the height of the fever and disappear with the fall of the temperature. I found but two positive reactions in 20 cases of pneumonia. In both the reactions occurred at the height of the fever, while the patient was taking sufficient food; and in both the reactions disappeared immediately after the fall of the temperature. In 7 negative cases the food was markedly insufficient in amount, although it contained a fair proportion of carbohydrates. These facts seem to show that the acid bodies were directly dependent upon the temperature. Meyer, however, claims, as the result of his observations in diphtheria, scarlet fever and measles, that acetonuria in the infectious diseases is independent of the sort or intensity of the infection and of the degree of fever, being due solely to carbohydrate inanition which is favored by the diminished power of carbohydrate metabolism in these diseases. In some instances, especially in typhoid, the acid bodies may persist, or first appear, during convalescence. They are then probably due to insufficient food or carbohydrates. In 15 cases of typhoid, in my series, 23 negative examinations were obtained in 13. The temperature was high in all these cases, and the food insufficient in amount in 4. Positive reactions were obtained in 2 cases at the beginning of convalescence; in one of these it persisted for eight days and only ceased when a sufficient amount of food was taken, although the food before was milk and barley-water. Acetone was present in 1 of 3 cases of bronchitis, and diacetic acid in 1 of 2 cases of pleurisy with effusion, while both were absent in 1 of empyema. Neither acetone nor diacetic acid were found in 2 cases of malaria, 3 of

cerebrospinal meningitis, 2 of otitis media, 2 of pyelonephritis, 2 of rheumatism, 2 of cystitis and 1 each of acute nephritis and mastoid abscess. The food was markedly insufficient in several of these, although all took some milk. The acid bodies are said to be seldom present in tuberculosis of the lungs and intestine, but almost always in tubercular meningitis and miliary tuberculosis. They were absent, however, in 3 cases of tubercular meningitis, all of which were taking almost no food, and in 1 of tuberculosis of the kidneys in my series.

The acid bodies in the urine are enormously increased in children during convulsions. Löbl found all the acetone bodies in a series of cases of tetany even when gastrointestinal symptoms were not marked. I did not find them in a case of tetany or in 1 of mild tetanus. They are, however, probably not the direct cause of the convulsions, because they are absent or present in only small traces in the urine of those diseases in which convulsions are most common, and because they may be present in large amounts without producing convulsions. They are not due to the lack of oxygen during convulsions, because lack of oxygen in conditions without fever does not cause them. The acid bodies and the convulsions are probably, therefore, independent of each other and merely manifestations of some common cause.

While the effect of fasting in the production of the acetone bodies has been pretty carefully worked out in adults, there are few or no data on the subject in infancy and but few in childhood. The effect of variations in diet has been but little studied at this age. Schrack (1889) never found the acetone bodies while a pure milk diet was being taken. They were found in a certain proportion of cases on a pure meat diet, and disappeared when an exclusively carbohydrate diet was substituted. Langstein and Meyer (1904) found the acetone bodies earlier and in relatively greater quantities in the urine of children from six to fourteen years of age who were fed on meat without carbohydrates than in adults under similar conditions. They assume that this is because the carbohydrate reserve in the liver and muscles is smaller than in adults. They call attention to the great danger of a fatty diet in children, when there is any disturbance of the carbohydrate metabolism. Czerny's and Keller's (1897) experiments on the excretion of ammonia in infants with gastrointestinal disorders point in the same direction. They

found that the excretion of ammonia was much increased when creams low in proteids and sugar were given, while it was not increased when milks high in proteids and low in sugar or diluted skim milk with sugar added were given.

I have had no opportunity to study the effect of starvation for periods of more than forty-eight hours in infants and children. The food was withdrawn in all these cases purely for therapeutic reasons and not for experimental purposes. Neither acetone nor diacetic acid were found in the urine of infants under two years under these conditions, but diacetic acid was found in a child of two, and acetone in a boy of nine years, after twenty-four hours of starvation. It quickly disappeared in both when milk was given. No acetone bodies were found in fifteen infants that had taken markedly insufficient amounts of food for considerable periods and were not gaining or were losing in weight. The food, being some form of modified milk, always contained, however, relatively large amounts of carbohydrates. What little evidence there is goes to show, therefore, that the effects of starvation and variations in diet are essentially the same, although more marked, in childhood as in adult life. The data for infancy are too limited to warrant any definite conclusions, although they seem to suggest that the acetone bodies do not appear in the urine as the result of starvation as soon as in later life.

Both acetonuria and diaceturia had been previously noted in the acute gastrointestinal diseases of infancy by von Jaksch, Schrack and Baginsky. Attention was more particularly called to acid intoxication in these diseases, in 1897, by Czerny, Keller and Van den Bergh. Keller first noted that the excretion of ammonia was increased both relatively and absolutely. This has since been confirmed by Camerer (1903). Van den Bergh showed that this increase was due to an increase in the acids in the blood because it was diminished by the administration of alkalis. Czerny attributed the acid intoxication to abnormal products of decomposition of fats and proteids, but did not mention the acetone bodies specifically. The work and conclusions of Czerny and his school have been considerably discredited, however, in recent years. Vergely, in the same year, reported 20 cases in children, 5 of them in detail, in which he found the acetone bodies. In 1 case the course resembled that of typhoid fever. The acetone bodies were found as soon as they were

sought, sometimes within a few hours after the onset. The acetone varied in amount from 10.5 to 12.5 grams per litre, and the B-oxybutyric acid from 6.8 to 8.5 grams per litre. The cessation of the symptoms and the disappearance of the acetone bodies from the urine were simultaneous. He divides the symptoms in these cases into two classes, nervous and gastric. The nervous symptoms are change of disposition, excitability, restlessness, irritability and insomnia; the gastric, anorexia, vomiting, thirst and constipation. There was no enlargement of the spleen, but slight enlargement of the liver. The temperature was sometimes elevated, sometimes not. It never lasted more than ten days. He concludes that these digestive troubles have a peculiar symptomatology, which is due to the presence of these acid bodies. He believes that the reason that the symptoms of acid intoxication are not more severe is because the eliminative organs are very active in childhood. Litten (1883) described 3 cases of a peculiar symptom complex in young children. A prodromal stage of a few days of mild symptoms of disturbed digestion was followed by marked nervous symptoms. The children became apathetic, whined continually, and could not be induced to move, play or take food. Sleep was interrupted and accompanied by groans and cries. An aromatic odor then appeared in the breath and drowsiness took the place of sleeplessness. One of the children had slight convulsive twitching. The type of respiration was not changed. With the appearance of the drowsiness diacetic acid was found in the urine. After two or three days the odor in the breath, the diacetic acid and the drowsiness disappeared together, recovery then being complete. These symptoms were altogether out of proportion to the severity of those in the digestive tract. He considers, however, that the primary cause is a disturbance of digestion. In a somewhat similar case reported by Krotkov, the diet for several days before had consisted almost entirely of fat pork. Similar cases in adults have been reported by Litten, Lorenz (1891) and Edsall (1902). Czerny (1897) has called attention to cardiac weakness and slowing of the respiration in infancy as the result of toxemia in the gastrointestinal canal, and says that the symptoms are like those of acid intoxication in animals. He does not mention the acetone bodies specifically.

All observers agree that the acetone bodies are rarely found

in the urine in the chronic gastrointestinal disorders of infancy. My own experience leads me to believe that they are almost never present either in acute or chronic gastrointestinal diseases at this age. It is rather surprising that they are not because the limits of assimilation for sugar in infants with gastrointestinal diseases are much diminished, and the conditions for the development of an intermediary acidosis are thus present. In a number of these cases, however, I have found sugar in the urine, but no acetone bodies.

The conditions seem to be markedly different in children, however. At this age the odor of acetone is not infrequently present in the breath, and the acetone bodies in the urine, not only in acute, but also in chronic disorders of the gastrointestinal tract. The odor of acetone in the breath, and the presence of acetone and diacetic acid in the urine, are especially common in the type of indigestion known as "chronic duodenal" not only during exacerbations but also in the intervals. Lorenz (1891) has already called attention to this fact in adults. I have found them pretty constantly in 2 cases during one and two years, respectively. This is not surprising, however, since the digestion of fat is especially interfered with in this condition. In a number of other children under my care, who are subject to disturbances of digestion, the odor of acetone in the breath is among the earliest, and is often the earliest, indication of an impending attack of indigestion. Examination of the urine at this time sometimes shows the acetone bodies, sometimes not. The peculiar odor in the breath is often associated with marked restlessness and irritability for some days before the development of other symptoms. Apparently impending attacks of indigestion can often be aborted or prevented in these cases by the use of bicarbonate of soda. In these cases the acid bodies appear when food sufficient, not only in quantity, but in the relative proportion of carbohydrates is being taken, and before the appearance of acute symptoms. They cannot, therefore, be attributed to starvation. These cases, while they resemble those in the group to be described later as recurrent vomiting, are more nearly like those described by Vergely. The symptoms of nervous irritability are marked and out of proportion to those of indigestion. They are sometimes accompanied by various forms of urticaria. The nervous symptoms cease with the disappearance of the acetone bodies.

There is no doubt that the acetone bodies are often present in small amounts in the urine in both acute and chronic gastrointestinal disorders in which there are no symptoms whatever of acid intoxication. In these cases they are certainly of no importance. There is no question, moreover, that in other cases there are marked peculiarities in the symptoms, especially in those referable to the nervous system, which coincide with the appearance and disappearance of the acetone bodies. In these cases we are certainly justified clinically, in spite of the small amount of these bodies, in concluding that they play a certain part in the production of the symptoms. We are not justified, however, in concluding that acid intoxication is the only cause of the symptoms. In fact, it almost certainly is not. In certain cases, nevertheless, in which the symptoms resemble more closely those of diabetic coma, it probably is the most important cause.

There is great difference of opinion as to whether the acetone bodies are formed in the intestine in these cases, or in the body as the result of abnormal intracellular processes. The weight of evidence seems to show that they are not formed in the intestinal canal. It is probable, however, that they are indirectly dependent upon intestinal derangements which produce complex nutritional disturbances, which, in turn, result in the formation of the acetone bodies. The primary cause is almost certainly located in the intestine. Although the acetone bodies are secondary products, they do, in many cases, cause more or less characteristic symptoms, which not very infrequently dominate the symptom-complex. The demonstration of their presence is unquestionably, therefore, of value, both in diagnosis and in treatment.

Under the name of "vomiting in acetonemia," Marfan (1901) described a series of cases in children apparently identical in their symptomatology with those described in this country as "cyclic," "recurrent," or "persistent vomiting." The odor of acetone in the breath was always present at the beginning of the vomiting, and in 2 cases he detected it before the onset of the vomiting, showing that it was not due to inanition secondary to the vomiting. The odor of acetone either disappeared with the cessation of the vomiting or persisted for a day or two longer. Acetone was always, and diacetic acid sometimes, present in the urine. The amount of acetone in three cases was 0.38, 0.40 and 0.60 grams per litre, respectively. In some cases the acetonuria persisted

for weeks after the cessation of the vomiting, although the children seemed in perfect health. In two instances several children in the same family were attacked simultaneously. He thinks that mild symptoms, such as loss of appetite and lassitude, may for a short time precede the onset of the vomiting. He thinks that these attacks have no connection with the kind of food, and that the exact cause is entirely unknown. He admits that the acetonemia, by itself, has no precise significance, and considers it merely as an indication of a disturbance of the nutrition which may develop under various circumstances. He believes that the presence of acetonuria at the onset shows that it is not due to inanition, and that the disease does not originate in the stomach. He is not justified, of course, in assuming the presence of acetonemia because of the presence of acetone in the urine and breath. If the term, "Vomiting in association with the presence of the acetone bodies," is substituted for the term used by him, his argument seems sound, however. In the discussion of a somewhat similar case reported by Guinon (1902), Guinon, Merklen and Siderey all stated that in their opinions regulation of the diet and attention to the bowels will not prevent the occurrence of these attacks. Barbier also stated that in his experience the odor of acetone always preceded the onset of the attacks. In one of his cases the urine contained about ten times the normal amount of acetone per kilo. Edsall, in the next year (1903), reported several similar cases very briefly, including some of the cases reported more fully a little later by Peirson. In the case most carefully observed by Peirson, acetonuria and the odor of acetone in the breath always preceded the appearance of the vomiting; in 2 others, acetone and diacetic acid were found early in the attacks. He thinks that the onset of the vomiting is always preceded by other mild premonitory symptoms, as well as by the presence of acetone in the breath and urine. These symptoms are slight rise in temperature, loss of appetite, abnormal movements or slight nervous manifestations. He thinks that after these symptoms have appeared change in the diet will not prevent the attack. Both Edsall and Peirson succeeded in aborting or relieving the attacks by the free use of bicarbonate of soda.

In addition to seeing 2 of Peirson's cases, I have seen 2 others in which the odor of acetone in the breath, or acetonuria, preceded for twenty-four or forty-eight hours the onset of the

vomiting. In several others I have found acetone or diacetic acid within the first twenty-four hours after the onset. In my cases also careful inquiry always revealed a prodromal stage of a day or two of slight indigestion, or nervous symptoms. Bicarbonate of soda relieved or aborted the attacks. Diet neither prevented nor relieved them. Some of these cases resemble, to a certain extent, those described by Vergely and others under the head of acid intoxication in connection with gastroenteric diseases, the chief difference being in the mildness of the digestive symptoms before the onset of the vomiting. In others, however, it is very difficult to trace any connection with previous digestive disturbances or errors in diet. Moreover, regulation of the diet does not prevent their recurrence. In all, moreover, the severity of the symptoms is entirely out of proportion to the evidences of digestive disturbance. The presence of the signs of acid intoxication before the onset of the vomiting, their association with the vomiting, and the simultaneous subsidence of the two, certainly seem to show that they are intimately connected. The fact that the attacks of vomiting can be prevented, aborted or relieved by the administration of soda, the antidote for acid intoxication, shows that they must be due, in part, at least, to the acid intoxication. It is probable that the origin of the acid intoxication is not the same in all cases. In some it is probably due primarily to disturbances of metabolism, whose nature and cause are unknown, while in others it is probably primarily due to disturbances of digestion, which presumably induce secondary disturbances of metabolism.

It is undoubtedly true that the clinical picture of recurrent vomiting may be present without any evidence of acid intoxication and entirely independent of it. This fact does not prove, however, that in those cases in which the evidences of acid intoxication are present, it is not the cause, or one of the causes, of the attack. It merely shows that more than one pathological condition can produce the symptom-complex of recurrent vomiting.

It must be remembered, also, that the association of the evidences of acid intoxication and vomiting does not justify the diagnosis of recurrent vomiting to the exclusion of other conditions. This is well shown by a case reported by Leignen and Mirallié (1904), in which after a few days symptoms of tubercular meningitis developed, and were followed by death in three weeks.

Brackett, Stone and Low (1904) recently reported a series

of 13 very curious cases occurring at the Boston Children's Hospital, on the surgical side, both before and after operation. They also quote a series of similar cases from literature. These cases all showed certain symptoms in common. These were: "Vomiting, associated with collapse; a very weak and rapid pulse; absence of fever; cyanosis, in the fatal cases, causing extreme dyspnea, apathy and stupor, alternating with periods of restlessness at first, but in the fatal cases, gradually deepening into coma and death; and the presence of acetone in the breath and urine." All these cases had extensive muscular atrophy as the result of paralysis or mechanical treatment. Autopsies were obtained in 4 cases. The only marked anatomical lesion made out was extreme fatty degeneration of the liver and muscles. They determined pretty conclusively that no single cause such as anesthesia, surgical shock, or change in diet, could have produced these symptoms. They conclude, however, that any one of these and other similar conditions may lead to changes in metabolism which, unless all the organs are sound and performing their functions normally, may produce serious or fatal complications. They attribute the symptoms to acid intoxication, and consider that the source of the acid bodies is the fatty degeneration of the muscles and liver. They finally conclude that the appearance of acetone in the urine, in quantities sufficient to give an ordinary clinical reaction, is to be regarded as an indication of serious, and possibly dangerous, disturbance of metabolism. Joslin estimated quantitatively the acetone excretion for twenty-four hours in 1 of these cases, a child of eight. The total excretion was 142 mgm., considerably more than the normal, but very much less than that found in diabetics, in whom it often reaches 100,000 mgm. This comparatively small amount of acetone would seem to cast some doubt on acid intoxication as the cause of the symptoms. In spite of this, however, the writer, who has seen a number of the cases, cannot help feeling that there is an intimate relation between the evidences of acid intoxication and the other symptoms in these cases, and that acid intoxication, whatever its cause, is the cause of the symptoms.

Conclusions.—The acetone bodies are not found in the urine of comparatively healthy infants and children by the ordinary clinical tests. They appear in their urine under approximately the same conditions as in adults. Certain disturbances of diges-

tion associated with the presence of the acetone bodies in early life have peculiar symptomatologies. It is probable that the peculiar symptoms are due, in part at least, to acid intoxication. It is also probable that the acid intoxication is not primary but secondary. The connection of the symptom-complex seen in many cases of recurrent vomiting with acid intoxication is probably even closer than in the digestive disturbances just mentioned. In these cases, also, the acid intoxication is presumably always secondary to some other abnormal condition, which may or not be digestive in origin. In any event, the etiology is obscure. In spite of the fact that the amount of the acetone bodies found in these conditions is relatively much smaller than those found in diabetes, the demonstration of their presence in connection with symptoms of gastrointestinal disturbance and the symptom-complex of recurrent vomiting, and probably also with other conditions, is of importance both in diagnosis and in treatment.

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DISCUSSION.

DR. EDSALL.—Dr. Morse has covered the general subject in a very complete way, and has so largely expressed my own views upon the subject that I shall do nothing more than mention a few details concerning some cases that I have seen since I directed attention, two years ago, to the relation between recurrent vomiting and acid intoxication. I feel in many ways still further convinced of the correctness of the views that I expressed at that time, and of the fact that some cases of recurrent vomiting can be controlled by treatment directed toward the acid intoxication. In my paper on the subject I mentioned a case that Dr. Griffith knows well, that of a child under the care of Dr. Sharpless, of West Chester, Pa. This child had such frequent and severe attacks that he was practically continuously incapacitated by them. I stated in my paper that the child was then improving, but had been treated too short a time to make the result at all clear. The further history has been that since the treatment with soda was started no attack has occurred, within about six months the child was able to attend school, and since this time he has had practically perfectly normal health. In another case, seen last fall, there were frequent mild attacks, and the general health was continually poor; that the child immediately improved in its general condition when put upon continuous doses of soda; there has been no attack since that time, and her general health is now practically entirely satisfactory. I have seen one further typical case, the child of a physician, in which the attacks were about as severe as they could be imagined, and their duration, severity and frequency had been increasing. Treatment in this case has not been as satisfactory; the child has improved, and in two years has had only three mild attacks, but it has not been possible to avoid attacks entirely. In all these instances large amounts of acetone and diacetic acid were present. In the first 2 cases I know that they were present at the very beginning of the attacks; in the last mentioned I have not been able to examine the urine at any time excepting when an attack had already lasted for several days. I have seen one other case that was referred to me as one of recurrent vomiting, but in which I think the diagnosis was questionable, since the child had a persistent and markedly dilated stomach. In this instance acetone and diacetic acid were not present at the time of the attacks, and whatever the nature of the case, treatment with soda did no good.

In my original paper I stated that I had little doubt that these attacks differ in their etiology, and I feel that this is almost un-

questionably true. In some instances, however, I am convinced that acid intoxication is, from the standpoint of treatment, the most important factor, and in these cases persistent use of alkalies and careful control of the diet will oftentimes either entirely control the attacks, or will cause decided improvement. I have been very forcibly impressed practically with one point that has been repeatedly demonstrated in the literature upon this subject, particularly in relation to the acid intoxication of diabetes mellitus; that is, the fact that acid intoxication, and the occurrence of symptoms therefrom, bears a close relation to a diet low in carbohydrates and high in fats. I think that careful investigation shows in a good many cases of recurrent vomiting that the child has had difficulty in digesting carbohydrates or is believed to have had such difficulty, and they have consequently been largely reduced or almost excluded, the deficiency having been made up to a considerable extent by increasing the fats. In this point, I think, lies one of the important elements in the perpetuation, and perhaps in the original production of the attacks, and also in the continuance of digestive disturbance of some other forms in children or older patients. In several cases of recurrent vomiting that I have seen, as well as in a number of other instances of gastrointestinal disturbance, I have found the children on a diet that contained very little carbohydrate, sometimes almost none, but a good deal of fat; and I have repeatedly seen, in various conditions, improvement in the symptoms and disappearance of acetone and diacetic acid from the urine, follow rapidly upon reduction of the fats, or their almost entire exclusion, and the use instead of considerable amounts of easily digested carbohydrates.

Some writers, in opposing the view that so-called acid intoxication *sui generis* produces the symptoms that occur in association with it, refer to the fact that the administration of alkalies will often not control the symptoms. This argument is entirely erroneous when it is applied to severe symptoms that are already present when the treatment is begun. Magnus-Levy in particular has emphasized the fact that in acid intoxication the acids probably unite not only with the alkalies of the fluids and tissues, but with the proteid tissues; it is well known that proteids readily form combinations with acids. The consequence of this must be an actual alteration in the tissues of the body, and consequently alkaline treatment, in order to be successful, must be begun early, before severe symptoms indicate that there have been extensive tissue-changes as a result of the circulation of the acids. To a certain degree the condition is comparable to tetanus and the use of tetanus antitoxin. The antitoxin is known to be a definite, direct antidote to the toxin, but it will not control the symptoms due to the tissue-changes produced by the toxin.

DR. KOPLIK.—Dr. Morse has laid much stress upon one fact which is borne out by my experience. In several cases of recur-

rent vomiting I have noticed the sweetish odor to the breath—the acetone odor. I recall very well one case, the child of a physician, a very good physiological chemist. The father examined carefully for the acetone bodies in the urine, but could not find them. I have also noticed this odor to the breath in a case of Henoch's purpura and case of severe gastric disturbance.

DR. HOLT.—This is an extremely important subject, and one on which we need all the light we can get. I have not been so fortunate as to see all my cases relieved by the bicarbonate of soda; I have seen some improve, but not all. I have come to look upon the presence of these acetone bodies as practically diagnostic of the attacks. In several instances, where children had been having a number of so-called attacks of indigestion, which had not yielded to treatment, an examination of the urine set the diagnosis straight by revealing the presence of these bodies. There is another condition that has been brought to my mind two or three times which is often confused with recurrent vomiting, and that is cases of chronic appendicitis; under those circumstances the presence of these substances in the urine is a diagnostic point worthy of consideration.

It seems to me Dr. Morse has not laid enough stress upon the purely nervous influences in these cases. It is a marvellous condition that so many cases should have occurred in the children of physicians, possibly there is a nervous influence to account for it. I recall 1 case of a child who went to a kindergarten school for the first time and was very much interested in the proceedings, but had an attack that night. He was sent to the country and got well, but even now anything out of the ordinary will bring on an attack in that child. Some children will have attacks every month or so, and then without anything special being done, may appear well for a year. I think we should go slow about adopting the view that soda is a specific in these cases.

DR. ROTCH.—I have seen quite a large number of these cases, and have tried all forms of treatment, but at present know nothing satisfactory as to the cause or treatment. The soda treatment was seemingly successful in a few cases, but in many entirely failed. The attacks may stop for years and then come on again. In 1 case, which is now under observation, the attacks began when the girl was two or three years old, ceased for a number of years, and have begun again at the age of nineteen years, being now more severe than ever before.

DR. CRANDALL.—These cases certainly seem to be very contradictory, and it leads one to suppose that there must be more than a single cause. I have seen cases with the nervous element prominent, and others in which there was not any associated nervous condition. In a recent case the soda treatment gave

brilliant results. The attacks were of the severe type, and the child vomited quantities of blood, but the soda controlled them.

As to the similarity to attacks of appendicitis, I know of 1 marked case that was operated upon, but no appendicial trouble was found. I have seen 2 other cases of supposed appendicitis that were relieved by the alkaline treatment and diet, so that I believe they were really cases of cyclical vomiting.

DR. TOWNSEND.—I had 1 case of recurrent vomiting who, after many attacks, had for the first time one associated with pain in the appendix region. A surgeon saw the case with me, and after the acute attack wore off did an operation, finding evidence of former attacks of appendicial inflammation, and since the operation the child has remained well.

DR. EDSALL.—I should like to say one word more, so that I may not be misinterpreted. From the remarks made by Dr. Holt and Dr. Rotch, I fear that I may be considered to hold that acid intoxication is definitely a disease. It is, of course, only a secondary condition, and it is always dependent upon some gross abnormality in metabolism or in the diet. I do consider, however, that in some instances it is, from the standpoint of treatment, the essential point to be held in mind.

DR. JACOB.—In many of these cases acid intoxication is the first and prominent and persistent symptom in the clinical condition that may finally lead to acetonuria. Before a society like this, I am almost ashamed to repeat what I have had the good or bad luck of saying hundreds of times during the last forty years, the fact that the symptoms have been relieved by the substitution of cereal food—carbohydrates—in the place of fat. If there is one thing that will produce these symptoms it is an excess of cow's fat. Where food containing a smaller amount of cow's fat than the chemical requirements of the books would justify is used, the children never have those symptoms. I believe it is well known that I give very little fat as regular food; the proportion in the food I give is 2 per cent. or less. I have not the slightest doubt that what has been considered as a cure in these cases would be a good preventive if given as a regular thing.

DR. MORSE.—I fear that some of my statements have been misunderstood. I said that the symptom-complex of recurrent vomiting might be due to a variety of causes. In one variety we find the acetone bodies in the urine, and in these cases the symptoms are almost always relieved by the alkaline treatment. It seems fair to consider that in these cases the symptoms are due to acid intoxication.

In regard to the use of soda for a long time, it seems to me that if it is kept up for many months it may interfere with the nutrition of the child. I think it is wiser to watch such cases for premonitory symptoms, and give the soda then,

EYE SYMPTOMS OF INFANTILE SCURVY. A CASE
OF INFANTILE SCURVY WITH EXTREME PRO-
TRUSION OF THE RIGHT EYEBALL, SHOWN BY
AUTOPSY TO BE DUE TO A LARGE RETROBUL-
BAR HEMATOMA.*

BY IRVING SNOW, M.D.,

of Buffalo, N. Y.

The eye symptoms of infantile scurvy receive small notice in works on ophthalmology, and the writer has recently seen a consultation of eight oculists result in much difference of opinion as to the significance, cause, and treatment of proptosis in a scorbutic baby.

The history of the case is interesting, as it is one of the few where the cause of the protrusion of the eyeball was shown by autopsy to be an extensive subperiosteal hemorrhage of the orbital bones.

The patient was the offspring of healthy young parents, who had two older healthy children. It was born after a normal labor. It showed an intolerance of cow's milk, and was given cereal milk, upon which it thrived for nine months, when it developed gradually pain, swelling and pseudoparalysis in both lower extremities. The loss of power was attributed to an obscure spinal injury by the family physician. Some weeks later, a slight protrusion of the left eyeball appeared, associated with blackened lids. Ten days later, a sudden protrusion of the right eyeball occurred, so extreme in degree that the closed lids left a large uncovered space on the cornea; both lids had a dark, bruised-like color, and were much swollen. Four days afterwards the baby became feverish and looked very ill.

The child was seen at 9 P.M., January 18th, by Dr. Lorenzo Burrows, who decided that the extreme proptosis of the right eye was not due to sarcoma, orbital cellulitis, or fracture of the skull, and referred the matter to Dr. Irving Snow as a medical case.

January 19th.—Examination by Dr. Irving Snow, 9 A.M.

* Read by title at the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 20, 1905.

Child very apathetic; good development; slight rachitic rosary, heart rapid and weak; nothing in chest or abdomen; temperature, 100°F.

Right eyeball protruding as in the most extreme case of exophthalmic goitre; cornea cloudy; upper and lower eyelids black and swollen, and do not cover the eyeball; no chemosis; eyeball freely movable; no discoloration of conjunctiva.

Moderate proptosis of left eyeball, with swollen, discolored lids; left cornea clear.

Gums slightly swollen and violet colored. No teeth.

Upper extremities, normal.

Legs below knee uniformly swollen and painful. Feet edematous. No purpuric spots or heat of surface.

The child thus presented a typical picture of infantile scurvy. The proptosis and swelling and pseudoparalysis of the legs were due to subperiosteal hemorrhage. Orange-juice, fresh milk and stimulants were given, but the temperature rose to 107.5°F. at 3:30 P.M. The child showed increasing prostration, and died at 11 P.M., after a stay of twenty-six hours in the hospital.

Autopsy.—An examination of only right eye permitted. A huge hematoma lay between the periosteum and bone of the orbit, filling the pyramidal space behind the eye and extending nearly around the entire orbit, stripping off nearly the whole orbital periosteum. No retinal hemorrhages. A smear from the clot showed large quantities of pus containing a bacillus like the influenza bacillus. Subperiosteal hemorrhage occurred in both orbits—in the left orbit, earlier and slighter in degree, and spontaneously ceasing. In the right orbit, an extensive, sudden hemorrhage took place, pushing forward the eyeball.

The rise of temperature in the last few hours of life was due to some terminal infection, probably proceeding from the infected retrobulbar hematoma.

The question of operative relief of the exophthalmos by removing the clot behind the eyeball was discussed, but was dismissed as unpractical on account of the moribund condition of the patient and the usual spontaneous absorption of the clot in a more favorable case.

Of the collective investigations of the American Pediatric Society¹ of 340 cases of scurvy, eye symptoms were mentioned in 49; a swelling mentioned in 9; in 18 protrusion of the eyeball; and in 22 both symptoms occurred. In the six autopsies reported

by the collective investigation, in none was an examination of the eye made. Heubner² reports 65 cases of infantile scurvy, orbit involved four times.

Regarding adult scurvy, Buzzard³ (Reynolds' System) says, in some cases at an early period: "The integument around one or both orbits is puffed up into a bruise-colored swelling; the conjunctiva covering the sclerotic is turned and of a brilliant red color throughout; the cornea lies at the bottom of a circular trench or well. There is nothing inflammatory about the condition. It resembles a very violent ophthalmia in color, but with no pain or discharge."

Sudden exophthalmos in a baby should at once excite suspicions of scurvy. It may, in fact, be the first indication of the disease. The rapidity with which the proptosis occurs indicates a hemorrhagic lesion.

Barlow⁴ (Grancher's System) says of infantile scurvy: "A remarkable symptom in one or both orbits is not rare. Suddenly, without premonitory sign or appreciable cause, we find a moderate exophthalmos, with the ocular globes turned downward. This symptom appears and augments for twenty-four hours. When it has reached its acme, one finds a deep ecchymosis and thickening of the superior lids, due to a hemorrhagic effusion. Both orbits may be affected, but successively and in an unequal manner. The proptosis may be only slight. There is no increase of intraocular tension or hemorrhage into the deeper parts of the eye. The eyeball is freely movable, not anchored by an inflammatory exudation, as in orbital cellulitis. The hemorrhage effusion into the eyelids affects the deeper parts; the conjunctiva of the lid and globe are only occasionally affected.

Similar cases of scorbutic proptosis have been collected, as follows:—

Barlow⁵ (Keating's System) describes 2 cases of scorbutic proptosis. He says it is dependent on a bone lesion, an extravasation of blood between the orbital plate of the frontal and its subjacent periosteum, the extravasation pushing out the eyeball.

(1) Eight-months-old baby, brought on account of proptosis of one eyeball. Great tenderness in the limbs, and general cachexia. Since early infancy the baby has been rather tender in the legs. During the last week the tenderness became excessive; both upper eyelids became suddenly swollen three weeks ago, the right upper lid purplish-red color, due to deep extravasa-

tion into its substance. No ecchymosis of palpebral or ocular conjunctiva. Slight proptosis of right eye. Cure after antiscorbutics.

(2) Ten-months-old baby, artificially fed. Legs tender at eighth month; at nine months the wrists became tender; there later developed ecchymosis in both eyelids; pseudoparalysis and slight proptosis of life eye.

Child died after an illness of three months. The autopsy showed subperiosteal hemorrhages. Eye not examined.

(3) Nicholai.⁶ Nederlausch. *Tijdschrift Vor Geneekunde*. Child nine months, brought to Nicholai for a sudden protrusion of the left eye. On both upper eyelids, there was a small greenish-yellow spot. Child otherwise well. Two days after Nicholai's first examination, a neuroparalytic keratitis developed, and Nicholai found in the gums the characteristic changes of scurvy. A few days later a retrobulbar hemorrhage occurred in the right eye. On antiseptic washes and antiscorbutics the keratitis and ocular protrusion disappeared.

(4) Ed. Meyer.⁷ Seven-months-old child, previously well, attacked with edematous swelling and pain in left ankle; left-sided exophthalmos. Death with increasing anemia. Autopsy.—Rachitis, anemia, hemorrhagic pachymeningitis, hemorrhagic periostitis of the left orbit and tibia, fatty myocarditis, hemorrhages into heart, lungs and kidney.

(5) Ashby and Wright.⁸ Girl, seven months old, fed on dried milk and maltose-food for seven months. Throve and looked like a prize baby. Bad cough for two to three weeks. Two weeks before examination, the left eyeball became suddenly prominent, and protruded so much that the nurse thought it would drop out. The proptosis was attributed to a slight blow on the eye the baby received from a comforter. The eye had been prominent for two weeks, during which time the baby had several bad fainting attacks. The baby was large and fat and pale; temperature 101°F.; drowsy, but readily aroused. The eyeball was exposed in part; the lids when closed did not meet; lids not puffy or ecchymosed; ribs beaded; no teeth, gums normal. Urine stained the diaper brown. Rapid improvement on fresh milk and orange-juice.

It is interesting to note that so acute and experienced an observer as Dr. Nansen⁹ looks on adult scurvy as a disease not due to the absence of a certain element in the food, but to the presence of ptomaines in badly preserved salt beef or other preserved

foods. He believes that with sterilized foods and properly given, there would be no scurvy, and that orange and lime juice are unnecessary. Both Dr. Nansen and Dr. Caillé believe that scurvy in adults and children is due to ptomaine poisoning.

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“Shorten the Time from the Cow to the Baby.”—Arthur R. Reynolds (*American Medicine*, October 22, 1904) lays stress on the fact that twelve-hour milk is worth very much more from a dietetic standpoint than twenty-four-hour milk. Milk may be unfit food for the young many hours before it becomes sour to the taste. Milk begins to deteriorate, as to its digestibility and wholesomeness, from the moment it is exposed to the air. It is one of the best mediums for the growth and multiplication of bacteria. In twenty-four hours after being drawn, unless checked by cold, there will be 400,000 microorganisms in each teaspoonful of milk. Souring is due not only to the growth of bacteria which have fed and multiplied on the nutritive constituents of the milk, thereby reducing its food value, but to their production of a special souring (lactic) acid and other poisons. Old milk not only starves the young, but it poisons them. All milk intended for the use of children should be bottled in the country, immediately after having been thoroughly cooled. The bottles should be packed in broken ice and shipped to consumers within twelve hours after bottling. The writer declares that no legislation will be enacted making the delivery of twenty-four-hour to thirty-six-hour old milk illegal until the public is educated to a knowledge of the evils of stale milk and its murderous effects upon the young. The writer concludes his paper with the quotation from Lord Derby: “Sanitary education is more important than sanitary legislation.”—*Medical Record*.

RHEUMATISM IN CHILDREN.*

BY HENRY B. DEALE, M.D.,
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However obscure may be the pathology of rheumatism, one factor at least has been definitely ascertained, namely, that it is a disease that differs widely in its clinical manifestations and phenomena as we pass from childhood to adolescence, and again into adult life. We are perhaps too apt to suppose that rheumatism is a comparatively simple disease, whereas closer observation tends to prove that it is a great complex, somewhat akin to gout in the variety of its clinical manifestations. Indeed, the symptoms of rheumatism, as they are generally accepted, may be so slight or masked during the earlier years as to escape detection, or if of a degree sufficient to attract notice they are often so vague or erratic as to be attributed to other pathologic conditions; on the other hand, the symptoms of other diseases may be so suggestive of rheumatic evidences as to lead one to an erroneous diagnosis. We all are too prone to rely upon the arthritic symptoms to reach our diagnosis, and to ignore other evidences quite as characteristic. The symptoms, as they appear in childhood, are so different in their order and degree that one may most naturally be misled unless he is familiar with their differences and unbiased by his experience with the disease as he has seen it in adult life.

The theory formerly held as to its cause has undergone marked change; the cause of then is an effect of to-day. Excess of lactic acid in the blood had been held for many years the causative factor of the disease. Foster, of Birmingham, in 1871, stated that in two patients to whom he had given lactic acid in 15 to 25 m. doses there had developed painful swelling of the joints. (This experiment has never very satisfactorily been verified by other investigators.) A so-called plausible theory of the day was that, under the influence of cold, lactic acid, which is always formed as a result of muscular action, fails to be destroyed by oxygenation, as it should be, and that when so accumulated it acts as an irritant to the joints. We now do not accept this as a causative agent; it may be that the blood is surcharged with lactic or other acid (but this is very difficult of proof), but even if so, it must be the result of a toxin of some infective agent circulating in the blood.

* Read before the Clinico-Pathological Society of Washington, D. C.

In the light of our present knowledge in other diseases the clinical and hygienic aspects of rheumatism present all the characteristics of an infectious illness. Investigation along this line began as early as 1887, by Pohoff; later by Triboult, in 1898, both observers noting a tiny micrococcus, usually occurring in chains or pairs. Westphal, Wasserman and Machoff, in 1899, in Berlin, found the same organism in a fatal case of chorea. More recently Paine and Poynton have described, under the title of "*Micrococcus Rheumaticus*," a diplococcus or a streptodiplococcus, which fulfils all the conditions as the specific cause. They say: "So soon as the micrococcus rheumaticus can with certainty be distinguished from all other micrococci which tend to grow in chains, we shall have the definite and essential point to attack the vast array of clinical conditions grouped as rheumatic or rheumatoid." It has been proven that a particular microorganism is constantly associated with rheumatic lesions, it can be cultivated upon artificial media outside the body, and by inoculation gives rise to characteristic lesions of the disease, and can again be isolated from these lesions. Culturally this organism resembles a streptococcus, but that it is specifically different is rendered probable by the test of Marmorek, who found that if a fluid medium in which streptococci of human origin have grown be filtered free from microorganisms and again be employed as a culture medium, bacteria in general can flourish in the fluid, while streptococci of human origin are entirely unable to multiply in it. Such a fluid, therefore, may be used as a test solution to determine whether a given organism obtained from man is identical with ordinary human streptococci or is different from it. Beaton and Walker applied this method to two specimens of the micrococcus rheumaticus on two occasions with positive results; in every case the micrococcus rheumaticus grew freely in a medium of filtered streptococcus bouillon, exhibiting considerable chain formation; this being true, it follows that the micrococcus rheumaticus is specifically different from the ordinary pyogenetic streptococci of human origin, and the specificity of the micrococcus rheumaticus is established. It has been isolated in all of the 15 cases examined by Beaton and Walker, eight times in acute rheumatism, three times in chorea, and four times in endocarditis of rheumatic subjects; it was secured from the heart's blood, fluid from the knee joint, urine, venesection, and from the blood from the ear. Paine and Poynton isolated this diplococcus in 22 cases of rheumatic fever, and have demonstrated

it in the principal lesions. They grew in pure culture and have produced by intravenous inoculation into rabbits identical lesions from which in turn they had isolated the bacterium. Seventeen rabbits, inoculated into the venous system, manifested the following results:—fever, wasting, monoarthritis, polyarthritis, paresis of the limbs, peri- and endocarditis, septicemia and death. The above pretty thoroughly establishes the bacterial specificity: the toxic specificity is still unsolved, but that some toxin circulates in the blood is evidenced by the concurrence of pyrexia, rapid anemia, erythema and purpura, polyarthritis, peri-, endo- and myocarditis.

As predisposing causes, cold and heredity occupy undoubtedly leading positions; it is a disease of families, and this fact alone is an aid in reaching a diagnosis. Age manifests the same irregularity in children as the other factors of the disease; among children girls are more subject to it than boys, but as the years advance this gradually changes, until in adult life men are more often the victims of rheumatism than women. It was formerly considered rare, or comparatively so, among the young; this still holds good so far as infants are concerned, but it is now recognized as much more common in childhood than formerly, due no doubt not to a change in the disease, but to a more careful examination of its vague manifestations. The arthritic implication is often so slight that it escapes notice or is attributed to other causes; redness and swelling of the joints are rare, and possibly only a tenderness or sensitiveness in the region is noticed; sometimes lameness or a disinclination to move about for a day or two is the only evidence; with this there may or may not be slight fever, never the degree of fever we are accustomed to find in older patients. Hyperpyrexia, or even high fever, is most exceptional, as are also the profuse acid sweats.

Tonsillitis or pharyngitis may be the first and only evidence of the rheumatic state; and in this particular Paine and Poynton isolated from a rheumatic sore throat the diplococcus which, upon intravenous inoculation into rabbits, produced arthritic symptoms and endocarditis. Torticollis and so-called growing pains are apt to be of rheumatic origin. Chorea, so long allied to rheumatism, may usually, upon closer inquiry, be traced to some antecedent history. The skin manifestations, purpura and erythema, are much more prevalent among children than adults.

Subcutaneous nodules, as commonly referred to by English writers, though evidently of rarer occurrence among us, are con-

sidered an especial feature of the disease among children. As described by Cheadle, "they are nodules which lie under the skin in connection with the fascia and tendons, that is in relation with the fibrous tissue; and similar nodular proliferations have been found in the periosteum, and even in the pericardium. They vary in size from that of a hemp seed to that of an almond, or even larger; when small they may not become visible until the skin is drawn tightly over them, although easily detected by the touch. There may be but one of these nodules, though usually three or four are found; indeed, sometimes as many as twenty or thirty. Their duration varies from a few days to several months. They indicate concurrent usually progressive cardiac disease, and that a similar process of inflammatory change and proliferation is going on in the fibrous tissue of the cardiac valves and pericardium. When many and large they indicate serious danger, an endo- or pericarditis, which is uncontrollable and advances almost certainly to a fatal ending. The connection of these nodules with rheumatism and rheumatoid arthritis is apparently absolute; so far as is known they own no other origin or relation." This has been quoted somewhat at length as so slight reference is made to them by American observers, while such stress and importance is placed upon them by foreign writers.

The most important as well as the most grave manifestation of the disease is the cardiac. I do not say complication but manifestation, as it is as much a symptom as nearly any other phase of rheumatism; the earlier in life rheumatism shows itself the more probable is the cardiac involvement, and the more severe the other symptoms the more liable is the heart to be damaged during its course; this is estimated to occur twice as frequently in children as in adults. It is a disease that attacks every structure of the heart; the endocardium, pericardium and myocardium are involved about in the order named. There is great diversity of opinion as to their involvement, but the great majority of observers estimate that sooner or later—due to the age, severity or frequency of attacks—one-half to one-third of all its victims manifest cardiac lesions. "It has been stated that endocarditis is liable to come on so insidiously, without its existence being known or suspected, until some other rheumatic manifestation leads to an examination of the heart and to the discovery of valvular mischief already established." Even when discovered during the course of the disease, the symptoms are vague, slight and slowly developed. There

may be first only a quickening of the pulse with an excited, uneven, irregular action of the heart, before any changes in the cardiac sounds are noticeable. Any valve may be attacked, but by far the most common is the mitral, next the aortic. Probably the first physical sign to appear will be a soft blowing, systolic murmur, heard at the apex, with possibly a slight accentuation of the second pulmonary, which points to a beginning leakage of the mitral. There is some discussion among observers whether these early cardiac symptoms are due to an endocardial or a myocardial mischief; if to the latter, that they are due to an acute dilatation caused by the action of a toxin upon the muscular structure, but practically this is of minor importance, as we fully realize that under either condition serious changes do finally result.

No physician who has had hospital or private practice can fail to be impressed with the number and seriousness of the cases of organic heart disease that come under his notice; the enfeebling and shortening of valuable lives which occur from this cause, particularly when the injury to the heart occurs, as it commonly does, early in life, must appeal to him both as a humanitarian as well as a citizen of the community. If this paper has any object in view it is to urge closer observation for the detection of the disease early in its course, and to discuss what measures, if any, may be suggested to modify or avoid the grave consequences of the disease as seen in chronic valvulitis.

The pathological changes in the valves of the heart, as well as the later symptoms, have intentionally been omitted from this paper, partly on account of time, but more particularly because both have been so fully dilated upon in text-books, besides one's personal experience renders them familiar to all practitioners. In regard to the early diagnosis of rheumatism in children in doubtful cases the following points of investigation may be of assistance:—

(1) *Family History*.—The influence of heredity is undoubted. Cheadle reports that 70 per cent. of his private cases reported rheumatism in near blood relations. The double inheritance (that is, on both father's and mother's side) increase to a remarkable degree the tendency to the disease.

(2) *Previous History*.—As regards joint stiffness without swelling, growing pains, nose bleed, frequent attacks of tonsillitis or erythema.

(3) *Present Condition*.—The appearance of the child, whether thin and anemic with lack of appetite and malaise, a

disinclination to take part in the games of their playmates; bronchial or gastric catarrh, purpuric-like spots over legs, that are not due to bruises, are all suggestive.

(4) *Temperature.*—Attacks of slight fever without apparent cause. Brunton in an article on "Endocarditis and the use of the Thermometer in its Diagnosis" goes so far as to say:—"If you find a murmur at the heart, or even where you find *no* murmur, if you find a temperature which runs a course like that of quotidian ague in a case where you can trace no malaria, and where you find no indication of suppuration, it is very likely indeed to be a case of endocarditis." Undoubtedly slight febrile attacks occurring in children do often furnish possibly the only evidence of rheumatic involvement; and the effort on our part to discover the cause of these slight variations in temperature will often lead us to the proper diagnosis.

(5) *Examination of the Heart.*—Especially as to its rate and rhythm, early evidences being cardiac irritability marked by excited action, with rhythmic changes, especially of remission and intermission; later physical signs appear—a soft murmur at the apex with reduplication of the second sound also at the apex, due probably to a retarded opening of the mitral; there may also be an increase in the cardiac area due either to a dilatation or even so early to a compensatory hypertrophy, as the compensation in children is much more prompt and efficient, due probably to a more sensitive muscular structure during its period of growth.

If from such an examination we are led to suspect rheumatism, what can we do to attempt to avoid the serious heart lesions? Of course, if any results are to be hoped for, the disease must be recognized early before serious destruction has taken place.

Naturally, the first thing to suggest itself is prophylaxis; that is, to protect in every way children in whom we know there exists a vicious tendency to the disease, from its exciting causes, such as cold, dampness or any undue exposure, lack of proper clothing which may be liable to favor its development. Those children in whom we have already recognized evidences of the disease without as yet cardiac symptoms we should guard against recurrence, as every fresh attack renders more probable the cardiac involvement.

Treatment.—To avoid or cure slight heart manifestations undoubtedly certain measures may be instituted that will in many instances be provocative of encouragement. The first is—

Rest.—In this particular Sir Wm. Jenner says: "Children do not grow out of heart disease, they grow into it." By rest we mean absolute quiet, no muscle work is permitted except such as is required for life; in this way we try to restrain the force and velocity of the blood current and lessen, if possible, the work of the heart, and diminish the pressure of the blood on the beginning diseased valves, as well as to lengthen the brief rest periods of the heart between its systoles. All stimulating food is withheld and only a slight, simple, easily digested diet is given; the patient is kept in strict recumbency, no getting out of bed or even raising the head. At the same time the patient should be shielded from any mental agitation or excitement. Holt says, "That the rest should be measured by months rather than weeks, and that the recumbent posture should be maintained until sitting upright is not attended by acceleration of the pulse rate or changes in its rhythm." It is pretty generally acknowledged that a beginning endocarditis, even when physical signs are evident, can often be cured if the heart work is kept at the minimum. Undoubtedly such stringent measures are often difficult to institute, but if the serious consequences are made plain to the parents and the possibilities of their avoidance is explained, much cooperation may be secured.

R. Caton, of Liverpool, who has probably given greater attention to the avoidance and cure of early heart lesions, adds two other measures to be instituted in the course of the rest treatment; the first is

Counterirritation over the upper part of both sides of the chest between the clavicle and the nipple, by the application of small blisters about the size of a quarter. His theory is as follows:—"If the stimulation of the surface skin will so potently assist recovery in a rheumatic joint, is it not possible that some beneficent change might also occur in the rheumatic heart if continued stimulation of its related skin areas were practised? The upper, middle and lower cardiac nerves on each side are associated with the three cervical ganglia of the sympathetic, and through them, probably, with the upper eight dorsal intercostal nerves. Through the upper and middle cardiac nerves (which communicate with the pneumogastric) the heart appears to be much more closely in relation with the first four dorsal intercostal than the remainder. This cutaneous surface and its nerves being so intimately related to the heart, it appears quite probable

that through the sympathetic that the rheumatic heart might follow stimulation similar to those which occur in a blistered rheumatic joint." Though his explanation seems very involved, his results have led him to place great reliance upon this procedure. His other suggestion as an adjuvant to the above two is the employment of absorbent drugs, sodium or potassium iodid and mercury in the form of calomel. Naturally, he has been criticised for not experimenting with only one of his three measures at a time, to discover if one only of these be the really efficient agent; his answer to this being that his success with the combination has yielded such good results that he does not feel disposed to dispense with any one.

Caton gives a detailed report of 86 cases so treated, divided into two classes. First, those in which the endocardial mischief came on under his observation—there were 31 such cases, of which 28 made a good and apparently permanent recovery. Second, those in whom the valvular trouble was manifest before they came under his observation (of course, of recent origin). Of these there were 55, of whom 36 left the hospital with apparently sound hearts.

This is a most remarkable and gratifying report from an observer recognized as capable and painstaking, and certainly such results warrant greater effort on our part to attempt to ward off a condition that cripples the usefulness of such a large number of individuals.

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Gastrointestinal Hemorrhage in the New-born.—Lop (*La Presse Médicale*, September 21, 1904), after reviewing unimportant hemorrhages from the bowel, due to lesions on the mother's breast, to section of the frenum linguæ, to wounds of the mouth produced during labor, etc., states that the principal cause of the real gastrointestinal hemorrhage is probably syphilis. Specific treatment should, therefore, always be instituted, besides applying warmth to the body, and injecting artificial serum with a few drops of brandy. Nursing should be suspended, and only boiled water given. Calcium chlorid, $7\frac{1}{2}$ to 30 grams daily, is useful. The writer has had poor results from gelatinized serum.—*New York and Philadelphia Medical Journal.*

ERYTHEMA NODOSUM; A DEFINITION AND AN ILLUSTRATION.

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Erythema nodosum may be defined as an acute infectious disease, closely akin to the exanthemata, *i.e.*, characterized by a period of incubation, of invasion, of eruption, of desquamation and by being contagious.

ETIOLOGY.—The disease is most common in childhood, and is rare in infancy,¹ being seldom seen under three years of age. It reaches its maximum of incidence about the tenth year, occurring with less frequency after this time until the early part of the third decade, when it again becomes more common. It is infrequently seen in later life.

In early childhood the sexes are about equally affected, but later girls are more frequently attacked than boys, while in adult life it is almost confined to the female sex. Like the exanthemata, it occurs most frequently in the spring and autumn. The exciting agent is unknown. Its contagiousness is but slight, but sufficient evidence has been adduced to prove that it is contagious.²

SYMPTOMATOLOGY. *Incubation*.—This period usually extends from eight to ten days.

Invasion.—This ordinarily occupies about three days, sometimes as long as a week. As a rule the symptoms during the invasion are slight and may be overlooked. They consist of malaise, anorexia or slight gastric disturbance; at times there is an irregular temperature, some prostration and more marked gastric symptoms; more rarely the condition may be typhoidal, and even meningitis be suspected.

Eruption.—This consists of the appearance of widely separated painful nodes under the skin, which find their site of election on the legs, especially the anterior and inner aspects. These nodes or lumps are frequently visibly elevated but can be even more readily determined by touch. They are red, sometimes bright, sometimes dusky, and vary in size from that of a pea to that of a man's fist, but are commonly one-half an inch

to an inch in diameter. They are smooth, indurated, and at times fluctuating; they merge insensibly into the surrounding tissue, and are very sensitive to the touch. At times and especially on other parts of the body they are papular. As the lesion grows older the color takes on the changes peculiar to a bruise. So characteristic is this that the French have for the disease the synonym *dermatite contusiforme*.

The eruption appears earliest and most abundantly on the legs, but frequently on the dorsum of the feet and hands, the thighs and forearms, more rarely on the forehead. As a rule it respects the trunk, but occasionally a node is found there. It is roughly symmetrical. The nodes occur in crops, each lasting a few days, so that the lesions are seen in various stages of development and retrogression. They are painful subjectively as well to the touch.

Over the node as it disappears a desquamation may occur, usually fine, more rarely in flakes. This period of eruption continues two or three weeks, not infrequently four to six weeks, sometimes two to three months.

During this stage there is an irregular febrile movement, often slight, usually mild, but at times as high as 102° or 103° F.; there is often a good deal of irritability and prostration. Joint pains are common, but frank involvement of the joint rarely occurs. Convalescence is established without incidence, except for a rather persistent anemia in many cases. Complications are rare and have reference in most cases to vesication, pustulation, ulceration and even gangrene of the nodes.³

There are two questions in connection with this disease which have long been and still are under discussion; namely, its relationship to erythema multiforme and its relationship to rheumatism.

Both dermatologists and pediatricists are about equally divided in considering erythema nodosum on the one hand as an independent morbid entity, and on the other as but one of the expressions of an erythema multiforme. Perhaps it would be fair to say that the conception of the disease in question as a separate disease has grown of late.⁴ If erythema nodosum be granted to be but one of the many manifestations of erythema multiforme, at least it must be conceded in turn that it has differences from the group at large far more striking than any other of the members.⁵

In erythema nodosum the lesion has more of the inflammatory character, is deeper seated, and instead of being merely a local eruption, at most hinting at infection as in erythema multiforme, it has all the characteristics of an exanthem; a period of incubation, invasion, eruption and desquamation; signs of constitutional disturbance and proven contagiousness; moreover it has a predilection for childhood and youth, while erythema multiforme affects all ages indifferently. Other minor points of difference might also be detailed.

That erythema nodosum occurs with rheumatism is well known to all students of the subject, but that erythema nodosum occurs in patients who have no rheumatic history is equally well known.

Schlesinger,⁶ in a recent article, has described two forms of the disease; one, the idiopathic erythema nodosum, having the clear-cut features pictured above; the other, the symptomatic erythema nodosum, which may occur in the course of rheumatism or in the course of most of the infectious diseases. This variety is associated with erythema multiforme and is less typical in its eruption and in its course. The lesions are smaller and show a transition into erythema multiforme while the constitutional symptoms are more variable.

Erythema nodosum occurs rather strikingly with purpura, coming on during an attack of purpura or itself, as the primary lesion taking on a purpuric character. Both lesions affect especially the legs.

The association with eczema is well recognized and its presence in tubercular subjects often reported.

Cases have been noted with almost all infectious diseases, for example, typhoid fever, scarlet fever, measles, diphtheria, influenza, pneumonia and erysipelas.

PATHOLOGY AND PATHOGENESIS.—The lesion is essentially an exudation into the skin, dermis and hypodermis. An angioneurosis seems to determine its inception, but a true inflammation is added to this. The inciting cause is a toxin or more probably the presence of bacterial emboli.

Type case from the records of the Out-Patient Division, Bellevue Hospital, Children's Department, First Medical Division:—

A boy of fifteen years, born in this country, and already a wage earner, whose work kept him confined to a factory during the day. Both parents are healthy and have two other children,

both well. The patient has had no other previous illness and has no rheumatic history. He presented himself at the clinic on April 10, 1905. His present illness began suddenly with a feeling of malaise, pain in the legs, the knees, especially in the calves and in the toes. At the same time there appeared an eruption on the shins and later on the thighs, painful to the touch. His appetite has remained fairly good and bowels regular.

Physical Examination.—On the shins were found scattered, discolored spots that looked like old bruises, which the patient pointed out as the sites of the painful lumps. On the anterior and outer sides of the thighs were several red elevations in the skin, presenting indurated areas, shading off into the normal skin and very painful to the touch. They vary from a half an inch to an inch in diameter, are movable on the deep tissues, pale slightly on pressure, the color returning immediately on relieving the pressure.

The heart, lungs, abdomen and throat were negative, there were no evidences of rheumatism, tuberculosis or syphilis. Temperature was 101° F. by mouth. Salicylates were ordered, seven grains every two hours.

April 12th. Patient felt no better in spite of the antirheumatic treatment instituted. Two new nodules had appeared on the right thigh and one on the left. Some of those seen two days ago were disappearing.

April 14th. In general the patient felt better, but said that the pain had come back again in the knees. Examination showed no articular involvement. One new nodule had appeared on the outer aspect of the left thigh, one on the inner aspect of the right calf and one on the back of the right hand. The heart showed no involvement. Temperature 102.6° F. Pulse 120. Leukocyte count 11,600. Polymorphonuclears 76 per cent. His appetite remains good.

April 17th. Pain is greatly relieved, but there was no interruption in the progress of the disease. Four new nodes had appeared on the right shin, one on the anterior aspect of the right thigh and one on the anterior aspect of the left thigh. The last had an area almost necrotic and was exquisitely sensitive to the touch. Temperature 102° F. Heart negative.

April 19th. The pain in the legs was still persisting. No new nodules had appeared and all the old ones had subsided ex-

cept the one last noted which was much smaller. Temperature 99.6° F.

April 24th. There were no nodules and no pain in the legs, but an entirely new symptom had appeared in pain and tenderness beneath the costal arch on the right side in front. The costal arch on this side was quite rigid to palpation, a sign the significance of which as indicative of inflammation in this region was emphasized by Dr. Ellsworth Eliot, Jr.,⁷ a short time ago. The pain was much increased on deep inspiration, and if the fingers were hooked under the ribs, in the manner advised by Murphy⁸ to elicit evidence of gall-bladder disease, the pain was intense. The gall-bladder was not palpable. There was no icterus and no gastric disturbance. Auscultation over this area elicited no signs. On the 22d, two days previous, he had had a similar pain in the corresponding area on the left side and also in the lumbar region on the same side. His temperature was 99.2° F. Leukocyte count 12,000. To our great regret, after this date the patient escaped from observation.

Nobody could have seen this case without being impressed with the picture of an acute infection, of which the eruption was but a single manifestation. The elevated temperature, the accelerated pulse, the malaise, the fretted, almost lachrymose, countenance (mentioned by some writers as characteristic), all bespoke more than a mere skin eruption. The two counts of white blood cells 11,600 and 12,000 might be taken to indicate a leukocytic reaction against toxic agents, while 76 per cent. of polymorphonuclears is a pretty liberal percentage in the blood of a boy of that age.

A feature of especial interest in this case was the deep-seated pain in the hypochondria, which might suggest some visceral complication,⁹ or the possibility of a lesion similar to that of the skin occurring in the diaphragmatic attachments.

The treatment by salicylates seemed in no way to shorten or otherwise modify the progress of the disease.

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"L'érythème nouveux est une entité morbide dont la nature infectieuse est spécifique a été pressentie depuis longtemps. . . . L'érythème nouveux est une maladie infectieuse, faiblement contagieuse en general, dont l'agent pathogene est encore inconnue."

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On the Surgical Importance of the Visceral Crises in the Erythema Group of Skin Diseases. American Journal of the Medical Sciences, 1904, Vol. CXXVII., p. 751.

Infantilism. — Ordinsky (*Roussky Vrach*, August 21, 1904) describes a case of infantilism in a girl aged fifteen years. The term infantilism was first suggested by Lasègue, who applied it to those adults who have retained infantile traits of body and mind, in spite of their years. In the case reported, the following characteristics of infantilism were found: The various parts of the body were developed in their proper proportions, but the intellect was that of a child of eight or nine years, and the genital organs corresponded in development. The skin was flaccid and wrinkled, pale in color, and the hair was scanty. The general attitude was one of apathy. The treatment consisted in the use of general massage and the administration of the thyroid extract. Under these influences the patient gradually improved. The dyspnea disappeared, and the pulse rate was lowered from 140 to about 110 beats. The short time of observation did not allow the author to determine the prognosis definitely.—*New York and Philadelphia Medical Journal*.

THE LEUKOCYTES IN WHOOPING-COUGH.*

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AND

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Fröhlich, in 1897, in his article on the pathology of whooping-cough, was the first to notice the condition of the blood in that disease. In contrast to the findings in other respiratory diseases of childhood, he found that in the 15 cases (ages eleven months to eight years) examined by him, the white cells were from 10,100 to 40,200 per cu. mm., the average being 20,000. The differential count showed that 26 to 68 per cent. of these were lymphocytes. The eosinophiles were, in some cases, as high as 10 per cent., absent in others.

The following year Meunier reported the examination of 30 cases. He found that the leukocytosis appeared during the catarrhal stages and reached its height when the paroxysms became most frequent. At the height of the disease the average count, in his cases, was 40,000; in 1 case a count of 51,150 was obtained. Like Fröhlich, he found that the leukocytosis was largely due to the increase in lymphocytes (45.4 per cent.), but states that there was an absolute increase in all varieties, except the eosinophiles. He believes that the leukocytosis bears inverse ratio to the age of the child and that complications have no effect.

The most complete work on the subject was done by De-Amicis and Pacchioni in 1899. Their report covers the results of the examination of the white blood corpuscles in 18 cases of whooping-cough in its various stages. In the catarrhal stage 8 cases (ages eight months to three years) were examined. The white cells were from 8,100 to 37,200 per cu. mm., and the lymphocytes from 31 to 73.4 per cent. Twenty-five counts were made during the active stage of the disease. The lowest count during this period was 7,350 per cu. mm., the highest 46,700, the average being 20,000. Only 1 case failed to show a count of less than 10,000 per cu. mm. during this stage. The percentage of lymphocytes was always high, usually being about 50. During the stage of subsidence eight counts were made, giving a leukocytosis of from 14,000 to 28,000 per cu. mm., average 16,000. The per-

* From the wards of the Cook County Contagious Hospital, Chicago, Ill.

centage of lymphocytes was always below 50, in 1 case less than 20. Only 1 case was observed in the three stages; this showed a respective count of 29,000, 28,000 and 16,000 per cu. mm., with 73.4 per cent. lymphocytes in the catarrhal, 65 per cent. in the active stage, and 48.5 per cent. in the stage of subsidence. Of the 3 cases observed in the first and second stages, 2 showed a marked increase in the leukocytes, the third a marked decrease. Of the 3 cases observed in the second and third stages, the total count was practically the same, but the percentage of lymphocytes decreased with the lessened violence of the paroxysms. In those cases where several counts were made in the active stage the first was almost invariably the highest and the lymphocyte percentage the greatest.

Wanstall, in the examination of the blood in 15 cases of whooping-cough in the catarrhal stage, found that no leukocytosis existed, his counts ranging from 4,288 to 12,000 per cu. mm., average 6,698; but the average percentage of lymphocytes was 55.4 per cent., 49 per cent. of which were of the small variety. Cabot reports 2 cases, one with a leukocytosis of 75,000, the other 32,000. In each the increase was largely in the lymphocytes, in 1 case being 69 per cent. Stengel and White report 3 cases with varied results.

The normal blood during infancy and early childhood shows, according to Carstangen, the following variations in its leukocytes:—At birth there are present 17,600 per cu. mm., with 75 per cent. polymorphonuclear leukocytes; within forty-eight hours after birth the lymphocytes begin to increase and the polymorphonuclears to decrease so that the average count for the first eleven months is: polymorphonuclears, 36 per cent.; small lymphocytes, 45 per cent.; large lymphocytes, 1 per cent.; transitional, 18 per cent.; and eosinophiles, 1-3 per cent. From the tenth month to the fifth year, at which time the blood reaches the adult type, there is a gradual increase in the polymorphonuclear leukocytes, and a decrease in the lymphocytes as follows:—

FIRST TO SECOND YEAR.

Polymorphonuclears, 42% Lymphocytes, 55% Eosinophiles, 3%

SECOND TO THIRD YEAR.

Polymorphonuclears, 48% Lymphocytes, 48% Eosinophiles, 4%

THIRD TO FOURTH YEAR.

Polymorphonuclears, 52% Lymphocytes, 43% Eosinophiles, 5%

FOURTH TO FIFTH YEAR.

Polymorphonuclears, 61% Lymphocytes, 33% Eosinophiles, 6%

Stengel and White found in their cases that the blood reached the adult type about a year earlier than as stated by Carstangen.

Within the past six months we have made an examination of the leukocytes in 15 cases of whooping-cough, all but one of which were patients in the contagious department of the Cook County Hospital, on the service of Dr. W. L. Baum. Only one examination was made in each case, consisting in a count of the total number of cells per cu. mm. and of a differential leukocyte count, Jenner's and Wright's stains being used. Of these, 1 case was examined near the end of the catarrhal stage and 14 at some time during the paroxysmal stage, between the fourth day and the eleventh week. In the following table the cases are arranged according to the duration of the disease at the time when the counts were made.

TABLE I.

	Age.	Duration.	Total W. B. C.	Pmn.	Small Lymph.	Large ymph.	Eosin.	Trans.
1	7 years	Catarrhal stage.	14,800	37.5%	49.5%	8.5%	3.0%	1.5%
2	5 "	4 days	48,500	47.1%	17.3%	34.3%	1.0%	
3	6 months	1 week	15,000	34.2%	15.3%	49.9%	.6%	
4	3 years	12 days	32,000	42.9%	45.0%	11.4%	.7%	
5	2 "	13 "	25,000	57.6%	15.4%	26.0%	1.0%	
6	7½ "	14 "	18,600	61.0%	8.5%	29.5%	1.0%	
7	4 "	19 "	38,400	58.8%	20.2%	19.5%	1.5%	
8	1 year	21 "	16,000	41.4%	29.9%	28.4%	.3%	
9	4½ years	21 "	18,300	60.5%	15.7%	23.8%	1.0%	
10	6 "	21 "	20,300	61.1%	16.4%	19.5%	2.0%	
11	5½ "	21 "	16,700	63.7%	17.0%	17.3%	2.0%	
12	17 "	21 "	13,800	66.0%	8.0%	25.0%	1.0%	
13	5 "	24 "	14,300	53.0%	18.0%	26.5%	2.5%	
14	5 "	28 "	12,500	52.3%	13.5%	32.4%	1.3%	
15	3 "	11 weeks	34,200	62.2%	11.0%	22.0%	3.6%	

No. 14, transitionals numerous.

No. 15, mast cells 0.3% and complicating gonorrheal vaginitis.

From the table it will be seen that a leukocytosis is present in each of the cases examined, ranging from 12,500 to 48,500 per cmm., with an average of 23,340 per cmm. The single case during the catarrhal stage showed a relatively low leukocytosis of

14,800 per cu. mm., with 58 per cent. of lymphocytes, 49 per cent. of which were of the small variety. The greatest leukocytosis was found, as a rule, in those cases examined in the first and second week of the paroxysmal stage, during which period the clinical manifestations of the disease were most marked. The average for the 5 cases counted during this period was 28,000 per cu. mm. After the second week a gradual diminution of leukocytes occurred as the termination of the disease is approached. A notable exception to this is the case of eleven weeks' standing with a leukocytosis of 32,200; but here the clinical symptoms were still well marked, and a complicating gonorrheal vaginitis was present.

The two most important points in the differential counts are:—First, the relative increase in the mononuclear leukocytes with a corresponding decrease in the polymorphonuclear leukocytes. In none of the cases were the mononuclears fewer than 33 per cent., while in 1 case they were as high as 65.2 per cent.; the average for the 15 cases was 45 per cent. Of the polymorphonuclears the average count was decreased to 53 per cent. Second, the abnormally high percentage of large lymphocytes present in all the cases except the one counted during the catarrhal stage. The large lymphocytes were in excess of the small in 11 of the 15 cases examined; the small lymphocytes varied between 8.5 and 49.5 per cent., with an average of 20.0 per cent., or about that of the normal blood, while the large lymphocytes were between 8.5 and 49.9 per cent., with an average of 25.0 per cent., or about four times the normal.

For comparison a brief review of the conditions of the leukocytes in the acute respiratory diseases of infancy will be of interest. In acute bronchitis Gundobin found an average leukocytosis of 17,500 per cmm., with 50 per cent. polymorphonuclears, 42.0 per cent. small lymphocytes and 8.0 per cent. large lymphocytes. Here the marked decrease is in the small lymphocytes and the findings bear a striking resemblance to those of Wanstall in the catarrhal stage of whooping-cough. Cabot states that the findings in bronchitis are the same as those in bronchopneumonia. In influenza there is no leukocytosis in about two-thirds of the cases and, when present, it rarely exceeds 12,000 or 15,000, and the polymorphonuclears are responsible for this increase. In bronchial asthma there is the same increase in eosinophiles during infancy as is found in adults. Bronchopneumonia

shows a marked leukocytosis with a high percentage of polymorphonuclear leukocytes. Leukocytes in whooping-cough show a higher percentage of lymphocytes than in any of these diseases, except in Gundobin's findings in acute bronchitis, and here they differ inasmuch as 85.0 per cent. of the lymphocytes found by him were of the small variety, while only 45 per cent. were of this type in the cases here reported.

Conclusions.—(1) A leukocytosis is usually present in all stages of whooping-cough.

(2) As a rule, the number of leukocytes increases with the increased frequency of paroxysms and becomes less as the paroxysms become less frequent and severe.

(3) The mononuclear leukocytes are relatively increased in all stages of the disease. This leukocytosis is present in the catarrhal stage, most marked in the active stage, and gradually disappears.

(4) In the paroxysmal stage the lymphocytosis was due largely, in the cases here reported, to the large lymphocytes. In the catarrhal stage, however, in the 1 case here reported, and in Wanstall's cases the small mononuclears were in excess.

We desire to thank Dr. A. M. Stober for furnishing us with the blood count in 1 case, and Dr. W. L. Baum, for his permission to report the other cases.

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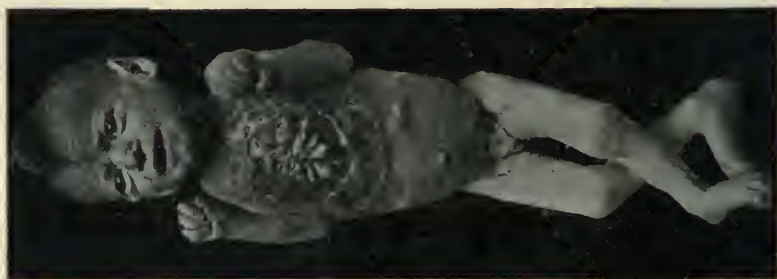
A CASE OF DERMATITIS GANGRENOSA INFANTUM.

BY CHARLES GILMORE KERLEY, M.D.,

New York.

The patient, one month of age, whose photograph appears herewith, was admitted to the New York Infant Asylum in April of the present year. The condition on admission, so far as the skin lesion was concerned, is shown in the cut, the photograph having been taken on the following day. Death occurred five days after admission.

The illustration and the autopsy findings tell the story of the case. The history of the illness previous to admission is not



DEEP ULCERATION IN CASE OF DERMATITIS GANGRENOSA INFANTUM.

known. The child had not been vaccinated, and there was no evidence of varicella. Forty-eight hours before death it was necessary to remove the child from the ward because of the fetid odor from the ulcer to a smaller room used for quarantine purposes, where it was visited by the nurse at two-hour intervals. It was impossible to remain for more than a few minutes in the same room with the patient. The autopsy was made by Dr. Thomas A. Neal, whose report was as follows:

Autopsy on Minnie B., age one month, weight 7 lbs. Diagnosis: Dermatitis gangrenosa.

Body very much emaciated. A large suppurating area over the anterior chest wall, extending from the second rib to the ensiform cartilage in the median line, and across from the left nipple line to the right anterior axillary line.

The ulceration extended only through the skin, except over the lower end of the sternum, where it extended down to the pleura. In the fifth and sixth interspaces on each side it extended to the width of from $\frac{1}{2}$ to $\frac{3}{4}$ inches. The sixth and seventh cartilages were eroded on both sides of the sternum through to the pleura. The edges of the ulcer undermined from $\frac{1}{2}$ to $1\frac{1}{2}$ inches, especially in the axilla.

On the upper part of the abdomen, on both sides, there were a number of elevated areas about 1 cm. in diameter. One was over the left trochanter and three in the left groin; also one on the outer and upper aspect of the eyelid of the left eye. These elevated areas were deeply seated pustules, not pemphigus bullae, and on opening them a thick, greenish-yellow pus exuded. One of these pustules, opened five days earlier, had entirely healed. Microscopic examination of the pus showed true staphylococci.

Peritoneum.—Very much congested, and covered with small flakes of fibrin. The blood vessels of the mesentery very much congested. The peritoneal cavity contained a small amount of dark colored serum which contained some fibrin. Lymphatics in mesentery very pronounced.

Lungs.—The anterior borders of the lungs met in the median line from the first to the third cartilage on the left side. Both lungs and pleura were negative.

Thymus.—It extended down over the pericardium to the centre of the anterior wall of the right ventricle.

Pericardium.—A slight effusion (15 ml.) of clear serum in the sac.

Kidneys.—Intense parenchymatous nephritis.

Liver.—Slightly enlarged and infiltrated with fat.

Spleen.—Enlarged and soft. Surface covered with fibrin.

Stomach and Intestines.—Negative.

Gonorrheal Endometritis. — Jung (*Zentrablatt für Gynækologie*, August 13, 1904) expresses his conviction that invasion of the endometrium in the gonorrheal vulvovaginitis of children is a great rarity. In 9 cases which he has carefully examined with great technical difficulty, he found gonococci in the cervical canal but once. In 20 other cases the germs were found but twice.—*New York and Philadelphia Medical Journal.*

ARCHIVES OF PEDIATRICS.

AUGUST, 1905.

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THE AMERICAN PEDIATRIC SOCIETY AND SCHOOL HYGIENE.

The recent meeting of the American Pediatric Society, held at Lake George, was made especially important by reason of the address of the President, Dr. Charles G. Jennings, of Detroit, on "The Medical Supervision of Schools and the Progress of School Hygiene," and by the appointment of Drs. Jennings, Jacobi and Abt as a committee to consider the welfare of children.

Dr. Jennings, in his introductory remarks, quoted the opinion of his predecessor, Dr. Caillé, that the Society should broaden the

scope of its labors by taking cognizance of public questions that relate to the hygiene of child life.

With few exceptions the papers presented before the Society have been on subjects strictly medical and have related to disease and its treatment. The late Dr. Christopher gave valuable statistics, the result of investigations made on the school children of Chicago, that showed the physical influence of study on the dynamic power of the growing child. While it may be claimed that all papers presented on the subject of infant feeding were physiologic, it must be acknowledged that the activities of the Society have been limited to the discussion of morbid processes rather than to the consideration of the actual physiologic changes incident to the growth and nutrition of children before pubescence.

Beginning as early as 1832, Sweden regulated school work, and in 1833 France passed laws relating to school physicians and school hygiene. It was not, however, until 1904 that the subject of school hygiene was regarded as of sufficient importance to call for international meetings. In that year a congress was held in Nuremberg, and the proceedings were of great interest and value. By the time the second congress is held in London, in 1907, the subject should have attracted the attention of physicians, educators and publicists to the need of oversight in matters connected with the physical well-being of growing children.

Medical inspection of schools in the United States has been influenced by the sentiment of communities where politics has frequently hampered a supervision of affairs not showing an immediate return for partisan support. Public sentiment has not been aroused because the general public has not understood that the education of a child goes beyond the training of the brain in spelling, reading and mathematics. It is essential for the welfare of our race that physical energies should be conserved and not exhausted. The hothouse plan of forcing a large class of children along the same path of learning should be stopped long enough to examine the individual as to his fitness and body strength. Our form of government makes a well considered and

impartially carried out inspection almost impossible. Different sections of the country have different views, and state and municipal enlightenment vary according to no definite cause. Some of the newer sections of the country, with a large foreign born population, have done more for the physical advancement of the children than the older and more conservative communities, where too often the stimulus to study is a false standard of intelligence. Boston and New York have had a medical inspection of schools for some years. More recently Chicago, Philadelphia, St. Louis, Washington, Detroit and other cities have followed in their lead. Unfortunately, however, most of the inspection is done for the purpose of limiting the spread of infectious diseases, so rife in all crowded cities.

In 1903 the Section of Nervous and Mental Diseases of the American Medical Association appointed a committee to inquire into the relation of school methods to diseases. Although the committee was formed to consider the need of school inspection to prevent disease, one paragraph of its report deserves to be quoted in connection with the importance of school inspection in determining the physical and mental growth of children. It urges school inspection "For the purpose of getting exact knowledge regarding the physical and mental capacities of each child, in order that the methods of instruction may be intelligently directed to meet the individual needs."

At the meeting of the American Medical Association held in Portland, Ore., in June of this year, a paper was read before the Section of Diseases of Children by Dr. Alice M. Smith, of Tacoma, in which national, state and municipal boards were urged to control the schools and bring under direct supervision all educational institutions where young children are taught.

In view of the general interest in this important subject, and knowing that the temperament of the American public is favorable to all means by which the race may be made stronger and of greater potential energy, it is not untimely for the American Pediatric Society to be represented by a committee of such

a character that it can confer with educational bodies and boards of health and advise them on subjects that relate to the problems of school hygiene and child growth. With the weight of its personal knowledge, and the sanction of the Society, the committee just appointed, has the power to command the attention of all public spirited citizens. To insure to our country a virile, energetic population it is imperative that the children should be well fed, well housed and well trained. All these things cannot be accomplished by one committee, but such a committee can make plain that the oversight of children is more than an inspection for infectious diseases and eye-strain, and that all examinations of school children should be with a definite idea of the physical, all round development of the individual so that he may become a sound and useful member of the community.

Sigmoiditis Due to Oxyurides. — Arullani describes (*Riforma Medica*, August 30, 1904) a case of sigmoiditis due to oxyurides. During the attacks of pain, and throughout the course of the disease, the patient continued to pass round worms in the feces. The patient improved markedly after the disinfection of the intestines, and when the symptoms disappeared, worms were no longer found in the feces. The treatment consisted in the use of thymol and benzoic acid in large doses, and the patient made a good recovery.—*New York and Philadelphia Medical Journal*.

Triple Invagination in an Infant. — Riedel illustrates (*Mitteilungen a. d. Grenzgebieten*, Vol. XIV.) a case of triple invagination in a five months' old infant. The ileum had become invaginated, through the ileocecal valve into the cecum, while at the same time there was retrograde invagination of the sigmoid flexure into the descending colon, and the lower end of the sigmoid flexure had become invaginated in the rectum. Conditions were restored to normal by a laparotomy, but the child succumbed to an immediate double pneumonia. The abdominal viscera were found apparently normal at necropsy.—*Journal of the American Medical Association*.

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In the preface the author gives as the excuse for the publication of this book the fact that under the strain of modern life disorders of the circulatory system have become more prevalent and are cutting short the careers of many of the most important members of society.

In the first chapter attention is called to the part played by the arterial system in the circulation. The arterial system is considered a reservoir which maintains constant pressure in the blood vessels, while the office of the heart is to pump into the reservoir sufficient blood to keep it filled.

Three groups of cases are described. I. Primary low tension cases. II. Primary high tension cases. III. Low tension cases in which there has been a preceding high tension.

The etiological factors, course, and management of these groups are considered. Attention is called to the correlation of pathological changes in the cardiovascular system, kidneys and brain in high tension cases and the importance of early diagnosis and treatment.

Emphasis is laid on the need of considering the pathogenesis of the individual cases in relation to the treatment; the importance of suitable vacations for people with large responsibilities; the benefit to be derived from hydrotherapy, and the dangers of exclusive drug treatment.

It is to be regretted that more definite indications for the different plans of treatment are not given. While the author has not added anything to the knowledge of the relation of blood pressure to diseased conditions, he has called attention to a number of clinical facts which are apt to be ignored in management and treatment of diseases in which the circulation is disturbed, and which are important influences in the high pressure of our American habits of life.

Society Reports.

THE AMERICAN MEDICAL ASSOCIATION.—SECTION ON THE DISEASES OF CHILDREN.

Portland, Ore., July 11-14, 1905.

JOHN LOVETT MORSE, M.D., OF BOSTON, CHAIRMAN.

J. ROSS SNYDER, M.D., BIRMINGHAM, ALA., SECRETARY.

Tuesday, July 11th.

THE CHAIRMAN'S ADDRESS.

DR. JOHN LOVETT MORSE took for the subject of this address

THE TEACHING OF PEDIATRICS.

He said that pediatrics could never be satisfactorily taught unless it was made a separate department. If made a part of any other department it was certain to be neglected. No man is competent to appreciate how much there is to be known about pediatrics and how little there is known about it, except the man who makes it a specialty. He said that he believed that the teaching of pediatrics should be given in the latter part of the third and in the fourth year of the college course. Before this time students are not competent to make the most of the subject, because they lack knowledge of internal medicine and physical diagnosis. There should be preparatory lectures on the anatomy, the physiology, the pathology and the development of infancy. As to the various forms of teaching he still believed that there is room for a moderate number of didactic lectures. The right sort of lecture paints a picture of disease, brings out the cardinal points, and leaves an impression on the mind such as no textbook can give. Recitations are useless. "Case teachings" attain the same result and assist the students to think for themselves. The bulk of the instruction should be given in the form of section teaching in the hospital. The most serious objection to this form of teaching is the large number of instructors required and the expense entailed. This does not militate against the value of section teaching and must, therefore, be overcome at any cost.

The teaching of pediatrics will never be ideal until the instructors, or at least the head of departments, devote their entire time and energy to their teaching. Men cannot do this when living salaries alone are paid. We must look to our wealthy and public-spirited citizens for assistance.

A PLEA FOR NATIONAL AND LOCAL BOARDS OF SCHOOL HYGIENE.

By DR. ALICE M. SMITH, of Tacoma, Wash.—In her paper she stated that it has been clearly demonstrated that disease is the result of living out of harmony with the laws of health and that disease is, therefore, avoidable. During infancy and childhood great strides are made in physical, intellectual and moral growth. They are periods of stress in which vital resistance is lowered. The fact that children spend a greater part of their time in school makes it reasonable to impose on the public schools of our country the burden of ameliorating whatever may be the unfavorable conditions to which they are born. The homes from which many children come are hot-beds of disease. The dust of the average school-room is rich in pathogenic bacteria. Other evils of faulty school hygiene are due to defective heating and ventilation, overcrowding, the mechanical irritation to respiratory apparatus from dust or dirty lavatories, eye-strain and infectious diseases. Postural diseases may result from faulty furniture and from faulty positions. A better system of hygiene is imperative to the end that children may receive the right of personal security against avoidable diseases.

A National board of school hygiene and of preventive medicine should be organized. The board to be composed of non-partisan physicians, the commissioner of education and, when we have one, the commissioner of public health, the organization to be provided for by the Government. The duties of this board should be to investigate school hygiene in its relation to human development and to investigate the causes and the means of preventing disease, degeneracy and crime among children. It should make itself an authority on school-house construction.

A state board should supplement the National board. The state board should select the location and should supervise the construction of school buildings. It should assist the National board in passing laws for the protection of school children. It should have power to close unsanitary schools and to determine the unfitness of incorrigible children for attendance in public schools. In addition there should be a municipal school board to cooperate with the above boards. The municipal board should be a repository for the individual records of all school children. These records should be transferred with the children.

If only one principal can be afforded in a school building, he

ought to be a graduate physician, whose duty it would be to guard the health and physical condition of the pupils.

DR. C. F. WAHRER, of Ft. Madison, Ia., stated that he believed that the ignorance of school boards, as they now exist, has been exaggerated by the essayist. He believed, however, that the aim of the paper was eminently right. A great deal of good might be accomplished for preventive medicine by medical societies publishing from time to time in the newspapers essential rules of hygiene and sanitation.

DR. A. W. FAIRBANKS, of Boston, in continuing the discussion, said that he thought that as most of the duties of a school principal are involved in non-medical problems of administration, it would be impractical to make medical graduates school principals. The questions of school hygiene, however, ought certainly to be referred to medical control.

RULES FOR THE CARE OF YOUNG INFANTS IN PUBLIC INSTITUTIONS.

By DR. H. M. McCLANAHAN, Omaha, Neb.—The author said the care of infants in public institutions presents peculiar difficulties. The resisting power of the institution baby is lowered by previous or present bad food, bad air and lack of care.

The object of the paper was to stress the importance of prevention. A plea was made for greater authority for the consulting physician in the management of hospitals. The physician, at least, should have control over the milk supply, and have authority to discharge any incompetent nurse. The essayist laid stress on the importance of ventilation, sunshine and air space.

In the care and disposal of soiled napkins, he advised the use of large galvanized iron buckets, containing a solution of common salt and sulphate of zinc. The soiled and wet napkins to be kept separate in these buckets; no soiled napkin should be allowed on the floor. As soon as removed it should be placed in its receptacle. After changing a baby's napkin, the nurse should thoroughly wash and disinfect her hands.

For feeding, modified milk is the best. Prepared infants' foods are not to be compared with it. The milk should be kept in porcelain-lined ice-boxes at 40°F. temperature. During the summer months it is advisable to pasteurize the milk. If infants are receiving pasteurized milk they are to be given orange juice

once daily. It is better to have one nurse in charge of the preparation of the foods. In this way, blame can be placed in case of error. The paper detailed the proper care of nipples and bottles.

As soon as an infant is observed to be sick, no matter what may be the expression of this illness, the infant should at once be isolated. During the summer the head nurse in an institution of this kind should be given authority to stop milk and to give a dose of castor-oil if a baby has offensive movements. The time intervening between the first indication of bowel disorder and the physician's visit may be of great importance to the child.

DR. J. C. COOK, of Chicago, believed that very few nurses understand the importance of nursery hygiene and sanitation. In the examination of the secretions of infants' mouths, he has found the colon bacillus so often that he has found it necessary to prohibit nurses handling napkins from touching any of the food or food vessels. He believed that we ought to instruct mothers more thoroughly in the proper care of hands and as to the disposal of diapers.

DR. FAIRBANKS, of Boston, spoke of reinfection in bowel disorders by unclean hands.

DR. WAHRER, of Fort Madison, said we would do well to enforce the strict rules of the institution in the home.

Wednesday, July 12th.

AMAUROTIC FAMILY IDIOCY.

DR. A. C. COTTON, of Chicago, reported 3 cases of this disorder. The interest in the paper was heightened by photographs and drawings of the patients in characteristic attitudes. The characteristic fundi were represented by drawings made from the eye-grounds.

The author drew attention to the identity of terms, "hyper-acousis" and "increased acoustic motor reaction," used by Sachs and Oppenheim, respectively, in their descriptions of these cases. The clinical findings were given in detail, including a description of the convulsions, of the explosive laughter, and of the disturbance of deglutition. The author does not believe there is any relationship between the disease and the quality of breast-

milk the infant gets from the mother. He admits its possibility, but asks for more evidence.

DR. JOHN L. MORSE, of Boston, spoke of the flaccid condition of these cases notwithstanding the paralysis. He said the eye-examination of these children was made easy because the child does not move its head about. The convulsions are peculiar and characteristic.

ATAXIA OF CENTRAL ORIGIN IN CHILDHOOD.

DR. ARTHUR W. FAIRBANKS, of Boston, gave a study of this symptom-complex, of which the most characteristic features are muscular incoordination of the extremities, trunk, head, larynx, tongue and eyes; slowness of muscular action; hesitating or deliberate speech, sometimes of nasal character, occasionally explosive; swaying, unsteady gait; tremor of the head, body or extremities; certain involuntary movements, which may or may not be of choreiform character and which may occur independently or be associated with volitional movement of some other part of the body; lateral curvature of the spine; deficient energy in executing voluntary movements; and, in an advanced stage of the disease, paralysis, muscular spasm and contractures. Vertigo, headache, optic atrophy, impairment of pupils and external ocular muscles, loss of muscular tone, apathy of facial expression, a tendency to unprovoked laughter, peculiar deformity of the feet, sensory disturbances, disturbance in the action of the sphincters and minor trophic disturbances in the skin, are to be considered as inherent, although less common, phenomena.

In the class of cases covered by this symptom-complex are to be included cases previously described under the title of cerebellar ataxia, hereditary ataxia, and Friedreich's disease. Careful study of a large number of cases result in the conclusion that it is impossible to establish any sharp differentiation between the various types reported; these cases merging into one another in a manner to make it evident that it is more a question of location, duration and extent than a difference of kinds. The results of pathological examination also indicate the dependence of the clinical variations on these three factors. The varying condition of the knee-jerks is, in the writer's opinion, of differential value only so far as it indicates whether or not the process has invaded certain definite portions of the nervous structure.

Several cases have come under the writer's observation in the early stage of the affection, in children from three to ten years of age. In none of these children were the knee-jerks absent. The clinical features of these cases were the unsteady "cerebellar" gait; marked ataxia of the extremities, especially the upper; and, in some, affection of speech, choreiform movements and nystagmus. That many of the symptoms suggest cerebellar affection is evident; and we find that postmortem examinations of well pronounced cases show, in addition to the degenerations of the posterior columns, cerebellar tracts and Clarke's columns, pronounced changes in the medulla, pons and cerebellum.

Symptoms similar to many of the most pronounced features of the symptom-complex have also been features of cerebellar affections in the human being, and have been seen as the result of experimental lesions of the cerebellum in animals.

THE PREVENTION OF SUMMER DIARRHEA.

By DR. MAURICE OSTHEIMER, of Philadelphia.—Summer diarrhea is due to two causes, unclean food and heat. Bacteria seem unable to act deleteriously until the vital resistance has been first weakened by heat and humidity. Hot weather also brings about deterioration of milk.

In prevention, the first effort should be to overcome the effects of heat. Infants should be bathed frequently, and excessive clothing guarded against. The infants should be kept in the open shade as much as possible. They must not be disturbed by petting and playing and must be allowed sufficient sleep. Flies must be kept away. Soiled napkins to be removed at once. Correct feeding and the care of bottles and nipples must be taught so that all may understand. The judicious distribution of pamphlets containing instructions to mothers for the care and feeding of infants during the heated term was advised.

In order to supply pure milk to rich and poor alike, dairies owned by the city and run upon modern methods under a milk commission should be established. The recent researches of Pennington prove that commercially pasteurized mixtures contain, after pasteurization, more bacteria than before. When performed more than six hours before using, the pasteurization and sterilization of milk are worse than useless. Clean milk would do away with any necessity for either.

The author gave a sample pamphlet containing detailed in-

struction to mothers. The best manner of distributing these pamphlets was also mentioned.

DR. COTTON, of Chicago, thought that children ought to be fed less fat and proteid in summer than in winter.

DR. MORSE, of Boston, objected to the name "summer diarrhea," and suggested that these disorders be called what they are—"diarrheas in summer." He also condemned the too early use of whey, which is still milk and a medium in which bacteria grow rapidly.

A STUDY OF 15 CASES OF SUMMER DIARRHEA.

By DR. JOHN C. COOK, of Chicago.—These cases came under the author's observation during the months of July and August, 1904. Eleven of the cases were mild. Four of them resulted fatally. Of the mild cases, the average age was nine and one-third months. These cases were either breast-fed by poorly-nourished mothers, or were artificially fed on every sort of milk and infant-food. The temperature varied from 97° to 102.5° F., with a total average of 99.4°F. Vomiting was present in some, but was not a constant symptom. The bowel movements varied from two to seven per day. Lesions were present in the mouths of a few of these cases.

The parasitic and bacteriologic findings in the stools were as follows:—the pneumococcus in 7 cases; sarcina in 4; colon bacillus in 7; yeast in 3, and mycoides in 1. There was a total of three varieties in each case. In the fatal cases, mouth lesions were constantly present. The bowel movements were more frequent, and vomiting was a more constant symptom. The findings of a pigmenting bacillus in the stools of one of these cases was of decided interest. This bacillus was of the color group and developed a red pigment so rapidly that the feces and mucous secretions were stained blood red. Several bloody stools were recorded and twice the nurse reported hemorrhage when no blood could be found in microscopic examination.

DR. FAIRBANKS, of Boston, had had similar experience in having bloody stools recorded and no blood showed under the microscope. He wants to have further reports made on this bacillus, and asked that a watch be kept for it.

DR. MAY MICHAEL, of Chicago, described the methods for obtaining bowel secretions for microscopic examination.

PNEUMONIA IN THE YOUNG.

By DR. EDWARD F. WELLS, of Chicago.—The recently born infant is least liable to pneumonia; the liability increases up to a certain illy-defined period to subsequently decline somewhat. He said that pneumonia is only due to the pneumococcus. Once the throat of a child is infected by pneumococci, the child is in constant danger of an attack of pneumonia. To an extent the child is protected by the integrity of alert respiratory reflexes. In the profound sleep following exhaustion or exposure these barriers are weakened and the infant or child is rendered more susceptible. Chill is absent in infants. Convulsions are rare. Pain is present, as is cough. The infant usually refuses food and drinks only at long intervals. As a rule, there are gastrointestinal disturbances. The blood contains pneumococci. Leukocytosis occurs early. Nervous symptoms are usually prominent. Surface pallor is the rule. Cynosis, except in fatal cases, is uncommon. The temperature quickly reaches a higher level than in adults. The duration is somewhat shorter than in adults. Empyema is the most frequent and serious complication. Otitis media is not uncommon. The author believed that in the better classes pneumonia is less fatal in the young than in adults.

In the treatment there is no specific. There are certain prophylactic and remedial measures, which are aimed directly at the destruction of the infectious organism and its toxins. Keeping the pneumococcus-free child out of range of the germ, avoiding exhaustion and too profound sleep in the pneumococcus harboring child, cleansing the fluids of the body of soluble toxins by use of normal salt solution are all measures of value. Vasomotor tonics and stimulants are at times useful. Systematic sponge bathing should be used for the relief of nervous symptoms and high temperature. Oxygen inhalations have proven serviceable. The purest, freshest and most comfortable air obtainable should be supplied.

DR. COTTON, of Chicago, believes it is important to maintain alkalinity of the blood.

DR. WM. J. BUTLER, of Chicago, thinks the diagnosis of lobar pneumonia is not difficult if a painstaking examination is made.

DR. F. C. RILEY, of New York, stated his belief in the efficiency of poultices.

DR. A. W. FAIRBANKS, of Boston, mentioned the extreme fetor of the breath in some cases, and believes it due to degenerative changes in the lungs.

DR. MORSE, of Boston, thought Dr. Wells ought to put more emphasis on the benefits of fresh air. He believed there is good evidence that we may overwork a heart, already under stress, by the use of too great quantities of salt solution. While children stand pneumonia comparatively well, in infants it more often proves fatal. Except for the relief of pain, poultices were useless and might be actually harmful.

PLEURAL EFFUSIONS IN CHILDREN.

By DR. C. F. WAHRER, of Ft. Madison, Ia.—Though easily diagnosed by careful examination, these cases are too frequently overlooked by the rank and file of the profession. Often when diagnosed they are not treated with sufficient vigor. Most cases of effusion in children have their origin in pneumonia. Many cases, however, are secondary to Bright's disease, scarlet fever, rheumatism, heart affections, pertussis, etc. There is no good reason for emphasizing the tuberculous origin. In puncturing an effusion care must be taken not to wound the diaphragm, which rises comparatively high in children. Puncture should be made in the posterior axillary line, sixth or seventh interspace, on the left and in the fourth or fifth on the right. If there are good grounds for suspecting effusion, repeated trials are to be made before failure is accepted. These trials are only to be made under the most pedantic care as to asepsis. In children of three and under, the effusion is almost invariably purulent. The prognosis is good, but depends on the treatment. It is most unfavorable when its diagnosis has been delayed, or when it has been treated expectantly. The treatment is surgical. Even sero-fibrinous forms recover quicker after incision.

TYPHOID FEVER IN CHILDREN.

By DR. WM. J. BUTLER, of Chicago.—In 210 cases the children presented symptoms for some time, varying from a few to ten days, before coming under observation. During this time there were restlessness and irritability in the younger children; in older children weariness, restless sleep, dizziness and buzzing in ears were noted. Headache was complained of in the majority

of children old enough to localize pain. Vomiting occurred in 57 cases. With the beginning of temperature thirst was increased and anorexia appeared. Colic was complained of in 47 cases. Of 107 cases in which the condition of the bowels was ascertainable, 69 had diarrhea, 31 constipation, and 7 were regular. A history of chills was obtained in only 31 cases. Epistaxis was not so frequent as in adults.

The symptoms observed during the course of the disease were as follows:—The tongue usually presented a whitish fur, with clean borders and tips. Later it became grayish or yellowish brown and dry. Anorexia was invariably present. In severe cases crusts appeared on the lips; the mucosa of the mouth was swollen and tinged. Noma was not found in any case. Otitis media was not uncommon. The bowels in 184 cases in which this point was actually noted were constipated in 100, and there was diarrhea in 84. The stools in young children were thin, yellowish green in color, sometimes slimy and curdled. In older children they were of the characteristic pea soup variety. Abdominal pain after the first week was seldom complained of. Tympany was present in most cases after the first week. The spleen was palpable in a majority of cases. Roseola were found in many cases. The respiratory rate was, as a rule, increased. In a large proportion cough was noticeable. Bronchitis was rare. The disproportion between pulse and temperature observed in adults holds good only in later childhood. In very young children it runs more or less parallel with the temperature. The Widal test was made in 96 cases, with 86 resulting positively. The urine was invariably scant during the height of the disease. An acute nephritis did not develop in any case. Relapses seemed to be more frequent in children than in adults. The mortality is considerably lower than in later life. Of the eleven deaths, four were from perforation. Two of these cases were operated upon.

THE MANAGEMENT OF TYPHOID FEVER IN CHILDREN.

By DR. W. C. HOLLOPETER, of Philadelphia.—He regarded typhoid as a general sepsis, and any treatment that will lessen the toxemia and lessen the leakage in the general circulation may be regarded as a step toward specific treatment. The first requirement is quietude in a large, well-ventilated room. Enteroclysis will reduce toxemia and temperature. At the same time it supplies much needed fluid to the body. Its combined effect is to

shorten the period of illness. Saline solutions and solutions of bicarbonate of soda are the ones most frequently used. If indicated tincture of asafetida or turpentine may be added. If hemorrhage occurs, a cold enema with external applications of ice is useful. If hemorrhage is excessive an ice suppository may do good. If the heart is weak, a small quantity of whiskey is used in the enema. An ice-bag at the head and a hot-water bag at the feet, with tepid sponging are his routine. Careful attention should be paid to the toilet of nose and mouth.

Through the whole course of the disease the diet should consist of albumen, water and peptonized milk. The importance of proper technic in enteroclysis was emphasized.

DR. COOK, of Chicago, said that in general practice it is hard to secure a nurse trained properly for injecting solutions into the bowels. The physician should leave full and detailed instructions. The physician must advise when to remove the ice bag.

DR. COTTON, of Chicago, emphasized the danger and ease with which the bowel may be injured by thermometers or tubes.

DR. MORSE, of Boston, said that the tendency of all these cases is to get well, no matter what the treatment, unless it be absolutely bad. The use of an abundance of water may be overdone. As to diet, he did not believe it necessary to keep these patients on an absolutely restricted diet. Milk gives a large residue, and diluted cream is, therefore, better suited to these cases.

Thursday, July 13th.

THE AFTER EFFECTS OF DIPHTHERIA ON THE HEART.

By DR. FRANKLIN W. WHITE, of Boston.—This paper was made up of a clinical study of 78 cases of diphtheria, with heart complications after their discharge from the hospital. The cases were under observation from five months to a year, to determine the frequency, importance and duration of subacute and chronic diseases of the heart following diphtheria.

The conclusions were as follows:—(1) The cardiac disturbance after diphtheria usually presents the picture of a mitral insufficiency with irregular heart action and few symptoms. Occasional cases have rapid pulse or cardiac irregularity without any other signs. (2) Moderate disturbance of the heart is very

common after diphtheria, and in a large number of cases persists from two to six months after the original illness. (3) In many cases the cardiac lesion does not clear up in the first half year, but lasts much longer; some ultimately recover; some probably do not. (4) The fact that children often have few symptoms after diphtheria must not mislead us as to the importance of the injury to the heart. (5) Cardiac disturbance of long duration may be entirely recovered from. (6) The treatment consists in a sufficient period of rest in bed, and then watching the effects of mild exercise for several months at least.

REPORT OF A CASE OF IMPERFORATE RECTUM WITH ABSENCE
OF ANUS.

By DR. EDWARD H. SMALL, of Pittsburg.—In this case, at birth there was no anus at all to be seen. When thirty hours old, a trocar was thrust into the perineum where the anus should have been and in the direction where the rectum should have been into the hollow of the sacrum. As soon as lack of resistance was noticed, the stylet was withdrawn. Meconium came through the canula. The canula was withdrawn and the bowel washed out with an enema containing olive oil. The opening was enlarged with a knife and the little finger introduced. The gut was situated about two inches from the perineum. A soft rubber catheter was inserted and left secured by a safety-pin. No attempt was made to attach the rectum to the external wound as it seemed firmly attached to surrounding parts. The wound was washed out and dilated with the finger for twelve days. On the fifth day the baby passed feces for the first time. Gradually the dilatations were dropped. At twenty months old, the case is entirely normal as to bowel movements and on examination of bowel structure.

A committee, composed of Dr. J. R. Snyder, Birmingham, Chairman; Dr. E. E. Graham, Philadelphia, and Dr. Frank S. Churchill, Chicago, was appointed to investigate, and to report at the next annual meeting, the status of pediatric teaching in the schools of the United States.

The officers elected for the Section for the next year are:—Dr. W. C. Hollopeter, Philadelphia, Chairman; Dr. Wm. J. Butler, Chicago, Secretary.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, May 9, 1905.

JAMES H. MCKEE, M.D., PRESIDENT.

SCLEREMA NEONATORUM.

DR. J. P. CROZER GRIFFITH exhibited the infant, aged ten weeks, which was recovering. There was no discussion.

CEREBROSPINAL MENINGITIS.

DR. ALFRED HAND, JR., who was to have shown several patients with meningitis, regretted his inability to do so because one had died, one who had recovered, showing no trace of cerebrospinal fever, had gone home, and the three remaining in the hospital were all too ill to be brought; one had tuberculous meningitis, and the others were instances of epidemic cerebrospinal meningitis. Dr. Hand wished to demonstrate under the microscope a slide from the case of tuberculous meningitis, showing tubercle bacilli and a predominance of lymphocytes, and also a slide from some fluid sent him by the President, Dr. McKee, showing the diplococcus intracellularis with an abundance of pylonuclear leukocytes. The chemical examination of the fluids from these 2 cases was strongly indicative of what the bacteriologic result would show, that from the tuberculous meningitis showing a large amount of albumin with the presence of sugar, while that from the epidemic meningitis showed albumin moderately increased and sugar totally absent; the latter condition also holds for pneumococcic meningitis, but when the former is present, increased albumin with sugar, meningitis being suspected, it is strongly diagnostic of tuberculous meningitis. "At least, in all such cases that I have examined," said Dr. Hand, "it has been possible to put on the capstone by demonstrating the tubercle bacillus."

DR. GRIFFITH referred to the case which he had exhibited to the Society three months before, and asked whether Dr. Hand could tell its further history. The patient, who was then in the one hundredth day of illness, afterwards grew worse, while still under his care, with a tendency to return of rigidity and hyperesthesia.

DR. HAND replied that that boy was one of the patients whom he had intended to show on this occasion; but that during the

last six days the patient had had two attacks of fever without any lesion to account for it. This might be explained as a fresh invasion of the meningococcus. Having just finished one of these attacks, the patient's mind was as clear, apparently, as it had been. He could answer questions, was not wasting any, and showed about the same condition as when exhibited. This is the most protracted case of the disease that Dr. Hand has ever seen, as the boy has now been sick for one hundred and eighty days. A few years ago there occurred, in Dr. Hand's service at the Children's Hospital, a case which lasted one hundred and ten days, a curious feature being ephemeral attacks of hyperpyrexia, the temperature rising from its usual range of about 100° to 106° or 107° F. in a few hours, and then subsiding as quickly as it rose; these came at irregular intervals of from five to ten days.

DR. MCKEE said that he should like to refer to the case mentioned by Dr. Hand, for it showed the extreme value of lumbar puncture as an aid in diagnosis. Dr. McKee saw the patient on the eleventh day of illness, and again on the twenty-third day; and he had been informed by two physicians, who had seen him previously, that it was probably syphilitic meningitis. In addition to unquestioned meningitis, the boy presented a typhoid facies, malar flush, typical typhoid tongue, sordes on the lips and gums, a moderate degree of hypostatic congestion, weak first sound, slow pulse, enlarged liver and enlarged spleen; and even in his semiconscious periods, he was tender in the right iliac fossa, and there was a great deal of gurgling present. In spite of the history, which was of sudden onset, accompanied with vomiting and high temperature, Dr. McKee was inclined to consider the case not meningitic typhoid, but a true typhoidal infection of the cerebrospinal meninges. He had seen one such case in which the history and examination were more misleading. On the twenty-third day a lumbar puncture withdrew 50 cu. cm. of fluid, which Dr. Hand had examined the day before the meeting. It was the most turbid fluid that Dr. McKee had ever seen; and he had never observed fluid spurt so far from the end of the needle. When the boy cried, the fluid spurted at least three inches.

DR. MCKEE read Dr. Hand's report of the examination of this fluid. He also said that from the therapeutic standpoint he desired to add that the boy had partially regained consciousness before he (Dr. McKee) had left the house, after having been either unconscious or semiconscious for three weeks. His tem-

perature fell from 104°F. on Sunday afternoon, when the puncture was made, to 101.2°F. on Monday morning, and had fallen progressively since then. That afternoon it was a little over 99°F. The case is one of those in which a marked, even though temporary, therapeutic result followed lumbar puncture.

In answer to Dr. John H. W. Rhein's question, whether he had ever found the staphylococcus pyogenes aureus in cerebro-spinal fluid, Dr. Hand said that he had often seen in cerebro-spinal fluid cocci which he had looked upon as a contamination. The slide with the tubercle bacillus, which Dr. Hand exhibited, showed also a diplococcus, not like either the pneumococcus or the diplococcus intracellularis, and not bearing any relation to the cells. It had appeared a day after the withdrawal of the fluid, and had made it cloudy. Dr. Hand finds it essential to take the precaution of singeing the cotton stopper of the test-tube after it had been held in the air, but this was not done in this case; and to this omission Dr. Hand attributes the presence of the diplococcus. He has always looked upon the presence of other germs than the pneumococcus, the diplococcus intracellularis, the tubercle bacillus and the typhoid bacillus in such cases as most likely to be the result of contamination.

THE INHIBITORY ACTION OF UNHEATED MILK UPON BACTERIA.

DRS. J. S. EVANS and T. A. COPE read a paper with this title. Different investigators, who have taken up this subject since the discovery of the bactericidal property of blood serum, have based their conclusions either for or against the presence of this property in milk upon experiments with milk which has not been absolutely sterile; on this account results have been varied. It has been the experience, however, of all workers that in heated milk a more rapid multiplication of bacteria occurred than in the natural product. This fact is taken by many as a proof that the heating of milk destroyed some substances similar to that found in blood which had the power of either inhibiting or destroying germ life.

The present experiments were conducted in order to determine whether this apparent bactericidal action was due to the property of the milk or due to the antagonism of one species of microorganism to another. To accomplish this it was necessary to obtain sterile milk. This was done by a specially devised apparatus and the experiments were conducted similar to those in testing blood serum.

The natural product, milk heated to 55°F for thirty minutes, 68°F. for twenty minutes, 100°F. for thirty minutes, and frozen, were used as a basis of the experiment.

A series of these specimens were inoculated; one with the streptococcus, one with the staphylococcus, one with the bacillus coli communis, one with the bacillus subtilis, one with the bacillus acidi lactici and one with a mixture of the two latter. Counts were then made immediately after inoculation, and four, eight and twenty-four hours later. It was found in each of the series that the percentage of increase was greatest in the sterilized specimens, next in the pasteurized specimens, and next in the specimens heated to 55°F. In the specimens inoculated with the mixed cultures it was found that the bacillus acidi lactici rapidly killed off the bacillus subtilis as well in the natural specimens as in the heated ones, which fact gave some proof for the belief that the results obtained by other investigators were in a measure influenced by bacterial antagonism.

The physical changes, that is, coagulation and digestion of the curd, went hand in hand with the character of the organism and the increase of its multiplication.

Conclusions to be drawn from these experiments are:—

(1) Unheated milk does possess a slight inhibitory action to the varieties of organisms used. This action at incubator temperature lasts from four to eight hours.

(2) Physical changes in milk have a direct relation to the number and variety of bacteria present.

(3) The antagonism of one species of microorganisms toward another must be considered in drawing conclusions from experiments made with milk containing the mixed bacterial flora.

DR. GRIFFITH said that, before the regular discussion was opened, he should like to know whether the curves on the charts shown represented the actual numbers of bacteria or only the rate of multiplication.

DR. EVANS said that they represented the latter.

DR. GRIFFITH replied that these showed, then, that, although pasteurization did not diminish the rate of multiplication, it did exert a favorable action in vastly lessening the actual number of germs.

DR. EVANS said that the question had come up in reference to commercial milk. In making tests of this, a count of 100,000

would have a mixed bacterial content. During pasteurization, the bacteria not killed would be the spore-forming organisms. The pasteurized specimens were found to contain fewer bacteria at the end of forty-eight hours than the original milk. The percentage of increase, however, he said, was greater.

DR. M. P. RAVENEL opened the discussion by saying that he had followed this work with a great deal of interest. The subject had been first called to his attention by some work done by Dr. Shaw in the laboratory of the State Live-Stock Sanitary Board, in 1897. After watching this work for some time Dr. Ravenel had come to the conclusion that a bactericidal action in milk had been demonstrated. The results of this work have never been published. Dr. Ravenel afterwards found that several observers, among whom was Dr. Park, of New York, had succeeded in demonstrating the same power in fresh milk. He said that it has been conclusively shown that immune-bodies may pass into the milk of immunized cows; so that the bactericidal power of the blood could pass, to some extent, into the milk.

Dr. Ravenel then remarked that, while he considered the work of Drs. Evans and Cope as the crown of all the work done along this line, he did not think that, practically, it tells us what we want to know. That pasteurized and sterilized milk will coagulate more quickly than fresh milk, under the same conditions, has been shown before. The practical question is whether, in handling the milk and putting it on the market as a commercial product, it should be pasteurized or not. It has been absolutely demonstrated by the work seen here that the pasteurization of very pure milk is folly. A considerable part of the work done by the Philadelphia Pasteurizing Society is gratuitous. To take a very pure milk and pasteurize it is wrong; for pasteurization produces, in certain conditions, malnutrition, while the keeping quality of the milk is not improved.

The mistake that the speaker considered to have been made in the work of Drs. Evans and Cope was that their tests had not been made with mixed milk. A very complete piece of work along this line had been done by Mr. Hunziker, of Cornell, who had tested the milk of fifteen cows, both individually and in mixture, at temperatures of 40°, 55°, 70° F., and even higher. He found that the bactericidal power varied tremendously with different cows. In some the bactericidal action would reduce the number of bacteria to a seventh of the original number. The

most marked bactericidal power was observed at 70°F., but was always of shorter duration than at lower temperature. It was always at an end by the twelfth hour, with an average duration of three to six hours, while at lower temperature (under 50°F.) it persisted twenty-four to thirty-six hours.

Mr. Hunziker noticed another point, slightly touched upon by Dr. Evans. He found that the acidity of the milk did not increase in proportion to the increase of bacteria, in a great many instances. In a large proportion of the samples of milk the acidity did not begin to increase until fifteen or twenty hours before coagulation; and at the time it did start to do so, the bacteria were innumerable.

For ordinary practical purposes Dr. Ravenel is a firm believer in the use of pasteurized milk, but he prefers certified milk when it can be obtained. Owing to the expense of the latter it does not seem that it will ever be possible for the community in general to use it. In the absence of certification, pasteurization must be resorted to. He, therefore, desired to know whether the more rapid curdling of pasteurized milk contraindicates its use. His own idea is that in the majority of cases it would do so; but he said that it should be remembered that many bacteria secrete a rennet-like ferment which produced a more or less sweet curd. As shown at the meeting of the Pathological Society, February 23, 1905, these milks do not show an increased acid-production, although they curdle more rapidly. The result is that there is formed a curd that is probably digestible and harmless. While not wishing to be considered as an advocate of the giving of curdled milk to infants, Dr. Ravenel thought that pasteurized milk on its way to the curdling stage would not do much harm.

The value of pasteurized milk has been demonstrated clinically the world over in innumerable instances. It would do great harm to inculcate a prejudice against its use generally. The charity of Mr. Straus in New York is ample demonstration of its value. The other advantage possessed by pasteurization is the complete elimination of all pathogenic bacteria. This has been absolutely proved. If, as Dr. Evans had suggested, the pasteurization be done in the bottle in which the milk is to be delivered, no reinfection can occur.

Dr. Ravenel thinks that further study as to the reason of the curdling of sterilized and pasteurized milk should be made, and that further effort should be made to learn the nature of

the substance that causes the coagulation, whether a ferment or an acid. He felt sure that in many cases the substance is a ferment, and not an acid. In addition, he suggested that the work should be repeated at different temperatures, it having already been performed at ice temperature and at incubator temperature. The germicidal property varies with the temperature at which the milk is kept. In concluding, Dr. Ravenel said that no one who has not been accustomed to doing laboratory work could appreciate the amount of labor that must have been expended by Drs. Evans and Cope in this investigation. He thought they were to be congratulated upon its accomplishment, and that the Society should be congratulated upon having the opportunity to listen to the presentation.

DR. GRIFFITH, in discussing the paper from the clinical side, said that it opens a subject a little wider than that to which the authors especially referred. He should, therefore, like to extend his remarks to the question of milk as a live thing. For a good many years physicians had been trying to obtain modifications of cow's milk that would make it like that of human beings; and great difficulty had attended this attempt. A mixture with apparently the same proportions could be obtained, but, when fed to the child, it did not produce the same result. It is only within comparatively few years that investigators have been laying more stress upon milk as being something alive, or, perhaps more strictly, as containing in it the remains of a living, cellular action. Upon this fact depends not only the possibility of the presence in the milk of bodies destroying bacteria, but also that of the various ferments which certainly exist in it. It is probably largely due to these ferments, as well as to other insurmountable chemical differences, that the digestibility of human milk is greater than that of the milk of cows. There is in human milk a whole series of ferments that do not exist in cow's milk, or exist only to a limited extent. One of these is the very much talked of amylolytic ferment. It is curious that this should be present, since at the period of the child's life when human milk is received, there is no expectation that starch will be ingested. This is probably the explanation of the claim made that the child fed on human milk is able to digest starch better than one that takes cow's milk. The presence of a fat-splitting ferment, a fibrin-breaking ferment, and an amylolytic ferment emphasizes the difference from cow's milk, in which they exist to a limited ex-

tent, if at all. On the other hand, there are ferments, such as oxydase, present in cow's milk, but absent, or nearly so, from human milk. There are also differences in the caseins of milk that chemical examination does not reveal. This is proved by the experiments of Bordet who injected into one animal the milk of another, developing in the blood-serum of the injected animal a substance that could coagulate the casein of the milk of the animal whose milk had been used.

The various ferments of human milk are all destroyed by heat, and this is probably true of the bactericidal bodies called alexins. Certainly the experience of Drs. Evans and Cope indicates that heat decreases the bactericidal properties of cow's milk. All these considerations support scientifically the commonly accepted view that breast-milk forms the best food for the infant; but that, when this cannot be had, cow's milk, in a natural, live state, is the next best thing, no foreign action, such as heat, having been employed. It is for the obtaining of this sort of milk that the Society has been working for for a number of years; and it had been hoped that when the public interest, in the newspapers and on the part of the Board of Health, was aroused, it would have been continued along the line of trying to procure clean, natural milk, instead of trying to remedy by pasteurization or sterilization milk that is not clean, and that cannot be made so. The bacteria may all be destroyed by heat, but the poisons already produced through bactericidal action will not be necessarily destroyed. When clean milk can be obtained, there is no object in heating it, and decided objections to doing so. It has long been known to clinicians that pasteurized milk requires greater care in its keeping than does raw milk. Dr. Griffith emphasized the fact that nothing he had said militated against the use of pasteurized milk under certain conditions, and prepared in a proper way. Pasteurizing is, however, an exact process, and must be done carefully. He said that he does not trust the commercially pasteurized milk at all, never prescribing it, and advising against it, when he finds that it is already in use. If one advises parents to buy pasteurized milk, one is giving them a false sense of security. The mere fact that a milk wagon has the label "Pasteurized Milk" upon it does not make the milk good. The parents, however, feel that it does. Much harm is done in this way. The same objection holds against a large proportion of the milk which is advertised by the dealers as "Certified." Dr.

Griffith much prefers to have parents get the best and cleanest milk that they possibly can. This should be certified to in a proper manner, as the Pediatric Society is doing. Persons who do not live in the city, and those in the city whose means do not warrant it, cannot obtain this certified milk, and have to get the best they can. Under these circumstances, Dr. Griffith would rather have them use pasteurized milk than anything else, but the pasteurization should be done at home in the proper manner, and the proper care be taken of the milk afterwards. Even if the bactericidal action of the milk is lessened by pasteurization, this is better than not to insure the destruction by heat of most of the bacteria in other milk.

DR. MARY E. PENNINGTON said that the commercial side of the question was the one that she had seen the most of. She heartily agreed with Dr. Griffith in regard to that, for she thought that after pasteurization milk is often richer in organisms than before. This is not because pasteurization does not remove them, but is due to the fact that in the process of getting the milk into the bottles more organisms are picked up than were in the milk in the beginning, as indicated in counts made by her.

Dr. Pennington thinks that the question of modifying milk for children should be considered in this connection; for when cream is added, together with milk sugar, to even a clean milk, there is afforded a means for the entrance of numerous micro-organisms. Cream almost invariably contains more organisms than does milk, and the commercial milk sugar is not bacteriologically clean. Therefore, something should be done, if it is desired to have the milk as fed to the child clean. Dr. Pennington does not see why this could not be readily accomplished by sterilizing the mixture of cream, milk sugar and water before adding it to milk. The proteid in the cream is in but small amount, and the fat would not ordinarily be injured by the short boiling required. By this means the number of organisms could be reduced to almost none at all, if the milk to which the mixture is added is itself clean. Such a mixture will keep perfectly well for more than twenty-four hours.

If, as is the usual custom, lime-water is added, there will be no increase, but often a decrease at the end of twenty-four hours; and Dr. Pennington believes pasteurization to be unnecessary in that regard. She has recently been making some experiments that are rather interesting from the standpoint of Dr. Evans'

paper; testing some clean milk removed from the can with a dipper sterilized in the usual hospital fashion, put into a clean vessel, covered with a sterilized towel and carried through corridors and up the stairs to a room in which it is bottled and modified. The samples, when first taken from the can, contained between 3,000 and 4,000 bacteria. After the milk had been taken upstairs, the number had increased to 14,000. The number of bacteria in the samples of clean milk had increased but slightly by the following day; the number in the milk taken upstairs, which was kept in the refrigerator, had decreased by the following day. This experiment has had the same result so many times that Dr. Pennington considers it established that the clean milk has some inhibitory action upon the dust germs that fall into the milk while it is being carried about.

DR. T. S. WESTCOTT said that Dr. Pennington had suggested a very important point in the management of cases of infant feeding. He has always held that cream is a fertile source of trouble in disturbances of digestion due to milk, especially in the poisoning cases. Unless the cream is produced by a centrifugal process, it is naturally older than the milk with which it is mixed; therefore, its bacterial content is usually higher also. Cases of milk-poisoning should often, and possibly in most cases, be called cases of cream-poisoning. Dr. Westcott thought that in summer the danger from cream is greater than from milk. For this reason it seemed to him that Dr. Pennington's suggestion that the small portion of cream should be boiled for a short time before being added to the milk is an excellent one. The sugar of milk and water can be sterilized by boiling at the same time, thus purifying the other elements of the mixture that are dangerous. In the summer Dr. Westcott is always very particular as to the source of the cream used in the milk mixtures under his control. If a centrifugal cream cannot be obtained, he directs that the cream should be obtained from milk of the same age as that used in the mixture, either by Chapin's or Townsend's method.

Dr. Westcott said he was glad that Dr. Griffith had referred to the work of the Milk Commission of the Pediatric Society. It has been a matter of regret that certified milk has not obtained the support of the profession in Philadelphia that it deserved. Several firms that were under contract with the Commission to produce certified milk have recently ceased to do so on account of the unsatisfactory monetary returns received by them. In

fact, there are now fewer firms producing the certified milk than there were a year or two ago; though it is a fact that the firms still producing it are doing an increasing business. Dr. Westcott said that it is unfortunate that physicians do not sufficiently appreciate the value of a clean milk. To the physician who works among children a clean milk is as important as a sharp knife is to the surgeon. The tools must be good; and unless one works with good tools one cannot produce the best results. For this reason Dr. Westcott urged the members of the Society to endeavor this summer to make a more extensive use of certified milk. The cost of it is greater than that of ordinary milk, but only slightly so. When one comes to count up the cost to the parents of even a very short illness in a child, it is easy to see that the dearest milk is the cheapest in the end.

DR. HAND said that when Dr. Ravenel had spoken of the impossibility of supplying the community with certified milk, he had thought of referring to a paper that he then had in his pocket; and that when Dr. Westcott had made his closing remarks he (Dr. Hand) became more resolved to do so. This paper, the bill of the printer for this month's certificates for the Milk Commission, shows that, while there are fewer dealers supplying certified milk than there formerly were, there is a much larger amount of the milk supplied. The gain in the amount of certified milk over that of four years ago is about double. That day Dr. Hand had had delivered to the four dairies, through the three distributing points, the certificates for the ensuing month; and he was surprised to see that the total number of certificates was 113,500, making about 300 quarts a day to Philadelphia. That amount, of course, is practically merely a drop in the bucket; but it is a matter of encouragement to those interested in clean milk to continue their missionary work.

DR. RAVENEL said that the question of popularizing the use of certified milk is one of education. With all due respect to Philadelphia, said he, there is too much conservatism when you try to start a new thing. One of the professors of the University, when advised to use certified milk, replied that he obtained milk from the same man he had been dealing with for a long time, and intended to stick to him. This dealer was found to be what is called a "platform buyer," and did not even know where the milk he bought came from. Another prominent practitioner said he did not like certified milk because it had no flavor. There have,

unfortunately, been attacks upon certified milk even by members of this Society, who do not seem to understand that there are limits to the certification. The milk cannot be examined every day, owing to the expense. The public does not realize how often certified milk is condemned by the Commission, when it is found to be below the standard. Even the milks that are certified, month after month, are often turned down on single examinations and the dairy required to correct the faults found before the certificate is issued. If an outside examiner happens to get a specimen of this inferior milk, he will naturally say it is below standard; and he may get hold of an old bottle. Only last month the cream from one of the best dairies averaged from 5,000 to 6,000 bacteria per cu. cm.; whereas, the milk at one examination was over 300,000. Dr. Ravenel did not know how to account for it, but every once in a while this happens in the milk from the best dairies. In such cases the milk is turned down and a re-examination required before the Society's certificate is given. It is not commercially possible to have a daily examination; and even if this were done, it would be forty-eight hours before the result of the examination could become known. This would be too late to avoid the danger from the use of any particular milk to a child, as it would have been already consumed. In the same way, the chemist cannot complete his examination in time to stop the use of the milk he finds below standard. Therefore, the best the Society can do is to exercise constant supervision over the dairies. If in a sample of milk there is found, for instance, the diplococcus of pneumonia, that milk is rejected without further counting; but, as a rule, from a numerical standpoint, the milk cannot be condemned until the lot from which the sample was taken has been consumed. These circumstances should be clearly understood, and Dr. Ravenel thinks that the Pediatric Society could do good work in making physicians understand them. He remarked that he could say, without fear of contradiction, that the Commission has three or four dairies producing milk that is unexcelled in the whole world. If this milk is not good, said he, milk should be given up as an article of food.

DR. D. J. MILTON MILLER said that he should like to call attention to something that has a practical bearing upon Dr. Evans' statement concerning the growth of bacteria in pasteurized milk. Dr. Miller spends his summers at a place where good milk cannot be procured. It is brought fifteen or twenty miles

over a rough road, and cream cannot be obtained at all in summer; it sours and becomes unfit for use. At first, it was his practice to recommend pasteurization. He induced people to get the cream and pasteurize it in the ordinary way. Notwithstanding this he found that a great many children developed diarrhea. He then made it his custom to instruct the persons that consulted him to heat the milk to a much higher temperature; to put it in a sauce-pan over a quick fire, and heat it, with stirring, for ten or fifteen minutes, but not to boil it, *i.e.*, to raise it to 185° or 190° F. For a great many years he has noticed that those who employ this process have much less diarrhea among their infants than do those who do not treat the milk in this way. This fact, Dr. Miller thinks, has a practical bearing upon the subject of the growth of bacteria; it seems to show that when milk is of questionable character, pasteurization is insufficient, and it must be raised to a higher temperature. He then referred to another point which had already been touched upon—that the worst offenders in this respect are often physicians. He knows of a number of instances in which fairly intelligent doctors have insisted upon using ordinary milk in their practice. He knows a prominent surgeon who brought up his child on a really inferior milk because it had been used in the family ever since he was a boy, and by his mother before him. The child was attended by a prominent pediatricist, but it is worthy of note that it was sick during most of its first year. Dr. Miller has had under his care this winter the child of a physician who told him that the child was using certified milk. When the infant got sick, Dr. Miller investigated and found that it was really getting "Abbott's best milk," at ten cents a quart. This physician was also a teacher in one of our Philadelphia medical colleges.

DR. EVANS, in closing the discussion, said that, in regard to Dr. Griffith's remarks concerning the natural ferments, he had a specimen of about eight ounces of milk a month old, from which they have taken a culture and found it to be sterile. At the end of two weeks a macroscopic change was seen to be taking place. It was difficult to emulsify the cream; whereas, in the heated specimens, it was much more easily mixed. Dr. Evans thoroughly believes that a good many of the changes taking place are due to a natural ferment or ferments, which may or may not have an effect upon the bacteria.

With the increase of certain forms of bacteria, there is an

increase in the acidity. Normal sterile milk is acid. When seeded with lactic acid bacilli, it was found that at the end of twenty-four hours there was an increase of from three to four points of acidity. This was more marked in the heated specimens, which in turn had a greater number of bacteria; whereas, in the subtilis there was a diminution of .1. This point was not mentioned in the paper, because the authors deem it necessary to perform the experiment a number of times, so as to be sure of the result.

ENCEPHALITIS AND OTHER NERVOUS AFFECTIONS COMPLICATING
SCARLATINA.

DR. JOHN H. W. RHEIN reported a case of scarlet fever in a girl of nine years, who presented the usual manifestations of the disease, together with a tremor of the general musculature, which appeared a few hours before death. The microscopic study of the brain revealed the presence of a mild inflammatory change in the cortex, as well as a moderate degree of meningitis. He reviewed the literature of the subject, and was able to conclude as follows:—The most common complications of scarlatina, on the part of the nervous system, are hemiplegia and peripheral neuritis. More rarely this disease may be followed by paraplegia, optic neuritis, amaurosis, tetany, pseudoataxia, neuralgia, epilepsy, disseminated sclerosis, Friedreich's ataxia, hysteria, hydrocephalus, meningitis and disordered mental states. Some of these conditions, like Friedreich's ataxia, are probably merely hastened in their manifestations by the scarlatina. With the exception of hemiplegia and imbecility the prognosis is good, if we exclude those rare organic cases, such as Friedreich's ataxia, epilepsy and disseminated sclerosis, which are recorded as following scarlatina. The pathologic findings consist of thrombosis, embolism, small cerebral hemorrhages, rarely abscess of the brain, congestion of the brain and meninges, and, finally, meningitis and encephalitis.

DR. B. F. ROYER said that he did not feel at all competent to discuss the pathological histology of changes in the brain and meninges, which Dr. Rhein had presented so admirably. He thought that in the particular case reported, two points should be considered before drawing conclusions. As pointed out from the clinical standpoint, the child was convalescent from measles, the rash of which was fading at the time of admission to the hospital; and some of the changes noted might have been due to the other exanthem. The patient also had a severe nephritis and

a fibrinous pericarditis. It was, therefore, a septic case, and not scarlatina alone. Dr. Royer went on to say that, if he recalled the case correctly, there was also suppurative otitis media. On admission, the child had a marked exudate on both tonsils, dark, brownish-gray, and very profuse. Cultures made from this exudate, from the surface and beneath, did not show Klebs-Loeffer bacilli, but did show streptococci. Thinking that there might be some diphtheritic element, antitoxin was given. After a few days her pulse became weak, and adrenalin chlorid was then administered. The reaction from this preparation was more marked than was desired. The patient developed extremely high arterial tension, and some of the perivascular changes might have been due to this overstimulation.

The findings are very interesting. Most of the quotations given by Dr. Rhein are from other countries than the United States. This is because at the present time scarlatina in this country is of a mild type, and nervous manifestations are not prominent. In Germany, the death-rate from scarlatina is running from 12 to 15 per cent., while in this country it runs from about 6 to 7 per cent. In England it is as low as 3 per cent. At the present time physicians are not seeing the number of nervous symptoms that were formerly rather frequently observed. The case quoted by Dr. Rhein showed not only intense angina, but the rash itself was of that intensely severe type in which there are bluish-red petechiæ. The usual circulation changes were absent. It was with difficulty that the blood could be pressed out of the superficial areas of the skin, and both legs and arms had distinct hemorrhagic petechiæ. This constituted an unusual type of scarlet fever, not the type usually seen in the United States. Dr. Royer concluded by remarking that he was very glad to have heard the paper and to have had the pleasure of discussing it.

DR. GRIFFITH said that he wished to express his appreciation of Dr. Rhein's valuable paper, which he hoped to see published. He considered it to be a valuable resumé of the subject. His own knowledge of such conditions in scarlet fever is, he said, slight, for the reason given by Dr. Royer, viz., that the vast majority of cases of this disease are of a mild type. The literature of scarlet fever speaks of sequels or complications very rarely in the nervous sphere, as compared with their frequency in some other diseases.

The Society then went into executive session.

Current Literature.

MEDICINE.

White, Franklin W., and Smith, Howard H.: Heart Complications in Diphtheria. (*Boston Medical and Surgical Journal*, October 20, 1904, p. 433.)

The authors studied nearly 1,000 cases of diphtheria at the South Department of the Boston City Hospital to determine the frequency and character of heart lesions and their significance in prognosis and treatment. Of the patients 5 per cent. were less than one year old, nearly 40 per cent. less than five years, and about 70 per cent. less than ten years old. About one-fourth of the cases were mild, one-half moderately severe, and one-fourth were severe; over one-half of the severe cases proved fatal. Of those that died about one-half succumbed to bronchopneumonia, usually following intubation or tracheotomy; about one-fourth died of heart complications; of the remaining quarter severe toxemia, asphyxia or late paralysis were the chief causes of death. On account of the usually late entrance of the patients into the hospital, antitoxin treatment could not usually be inaugurated until the second or third day of the illness; the large majority of the severe and fatal cases averaged four or five days without treatment with antitoxin. Murmurs were exceedingly common, but other evidences of heart disease—dyspnea, dropsy, cyanosis and hemorrhage—were not common. Irregularity of the pulse was noted in 60 per cent. of the cases, often upon admission to the hospital, but usually from one to two weeks after entrance. It was not found that this irregular pulse was a sign of great weakness nor of approaching death. The irregularity of the pulse was found more often among the younger patients than among those over sixteen years of age. The murmurs were systolic in time in almost all cases; they were heard at both apex and base in 77 per cent., at the apex alone in 20 per cent., and at the base alone in about 3 per cent. of the cases. The majority of the murmurs were associated with irregular heart action and outlasted the fever. The clinical course of the disease does not explain the cause of these murmurs. Pathologic studies show that there is a relative mitral insufficiency resulting from changes in the heart muscle or in its innervation. Endocarditis and pericarditis are very rare as complications of diphtheria.

The commonest type of serious cardiac involvement is that in

which there are gallop rhythm, vomiting, epigastric pain and tenderness. The first sign is an increase in the pulse rate up to 140 or more; then the gallop appears. Except for a little pallor, loss of appetite and restlessness the child may not seem affected. Rapidly increasing prostration soon follows, however, the child becomes blanched, and vomiting occurs without nausea. There is also developed epigastric pain and tenderness with marked spasm noticed on examination. These signs continue until death occurs or recovery begins. Thirty-six cases developed gallop rhythm and two-thirds of these died; among those that recovered three-fourths had antitoxin before the fourth day; while of those that died four-fifths had no treatment until after the fourth day. Mild cases must remain in bed for two weeks; cases with persistently rapid pulse should be kept in bed at least four or five weeks and then allowed to sit up gradually. Cases with gallop rhythm must be kept absolutely quiet in bed, and the nourishment should be liquid.

The points summarized are as follows:—(1) The great frequency of heart murmurs and of irregularity of the pulse. The prognosis does not depend on the mere presence of these signs, but upon the severity of the infection, the length of time without treatment, the rate and degree of irregularity of the pulse, and the presence of the graver signs of cardiac disturbance. (2) Moderate disturbance of the heart is very common; severe complications are infrequent. (3) Frequent examinations of the heart are necessary to really determine its condition, because of the marked changes in rhythm from one hour to the next. (4) Gallop rhythm, late vomiting, and epigastric pain and tenderness are important as danger signals of severe heart complications. The association of late vomiting with gallop rhythm renders the outlook almost hopeless. (5) Antitoxin does not affect the heart unfavorably, but, on the other hand, its early use prevents the appearance of grave heart complications. (6) Frequent examination of the heart and pulse in the second and third week of the illness are necessary, that being the time when severe heart complications most frequently occur. (7) Bronchopneumonia is a more frequent fatal complication of diphtheria than heart disease; sudden death from heart disease is very rare when patients are kept in bed for a proper period. (8) Prolonged rest in bed is necessary in all severe cases; it is not necessary to keep all patients in bed who have cardiac murmurs and a pulse which

is somewhat irregular and increased in rate. One should be governed by the stage of the illness and the patient's general condition. If no serious heart trouble has developed within four weeks, the patients are usually safe from this complication. (9) Heart murmurs and irregularity are of long duration in many cases, and make it necessary to watch the condition of the heart long after convalescence in all severe cases.

Mackey, Charles: Tuberculosis of the Cerebrum and Cerebellum with External Pointing of One Caseous Mass. (*British Medical Journal*, January 28, 1905, p. 186.)

A girl five years old had headache and vomiting; one month later vision failed and the legs were practically paralyzed; there was occasional incontinence of urine. On admission to the Manchester Children's Hospital three months after the onset the child was pale, weak, blind, but intelligent, unable to walk or stand, but with good control of arms and hands. Sensation was normal, ankle clonus present on both sides, Babinski's sign also present; the knee-jerks were present; pupils active but unequal, the right larger, with marked optic atrophy in both eyes. By two months later hydrocephalus and retraction of the head were beginning, the sutures opened up and over the left coronal suture a conical fluctuating, pulsating swelling appeared. Only clear fluid was obtained by the exploring needle. Three weeks later necrosis occurred at the apex of the swelling and cerebrospinal fluid escaped. The patient lapsed into coma and was operated upon without general anesthesia; after trephining, exploration of the brain was made and the ventricle tapped; much fluid drained away. On opening the skull after death, six hours later, the membranes were found adherent to surface of cerebrum over left mid-frontal gyrus around situation of the tumor, which was a yellowish nodule about the size of a Barcelona nut. Its apex was formed of necrosed brain-tissue; in the deeper layers many giant-cells were seen and below a thick caseous mass, around which was a large number of leukocytes. This surrounding infiltrated zone gradually faded until normal cerebrum was reached. The tuberculous nodule had made its way through membranes, coronal suture, and scalp. Examination of the eyes showed several small tubercles in the choroid. There was another smaller caseous nodule in the left supramarginal gyrus one-half inch from the surface. The cerebellum showed very little of its normal tissue, the whole of the vermis and most of the lateral lobes being caseous.

SURGERY.

Murphy, John B.: Case of Tetanus Successfully Treated by Aspiration of the Cerebrospinal Fluid and Injection of Morphin-Eucain and Salt Solution. (*Journal of the American Medical Association*, August 13, 1904, p. 460.)

An eight-year-old boy was admitted to the hospital with trismus, some contraction of the neck muscles with opisthotonus, seven days after cutting his foot on a piece of dirty glass. Under anesthesia some glass and pus were found in the foot wound, but cultures did not reveal any tetanus bacilli. The convulsions continued, so that on the following day he was given three full doses of antitetanic serum without effect, the convulsions becoming almost continuous. Two days later 16 cc. of cloudy cerebrospinal fluid were withdrawn by lumbar puncture, and through the same needle there were injected 3 cc. of the following solution, sterilized by boiling:

R B-eucain	0.09
Morphine sulphate	0.02
Sodium chloride	0.18
Distilled water	105.00

The patient slept four hours following the injection, and through the night slept one and one-half hours at a time. The spasms became shorter in duration, and there were only eight in the succeeding twenty-four hours. Then 15 cc. of cerebrospinal fluid were drawn off and 4 cc. of the above solution injected. Similar injections were made daily for six days, then on alternate days for six days. The spasms gradually ceased, the trismus relaxed and the boy was discharged cured three weeks after admission, or four weeks from the date of injury.

Murphy considers eucain much less dangerous than cocain, and was particularly struck with the muscular relaxation that followed the morphin-eucain injections.

Gibney, V. P.: Is Not the Treatment of Congenital Club Foot Begun Too Early? (*American Medicine*, October 29, 1904, p. 761.)

The long course of treatment, to which nearly all cases of congenital club foot must be subjected, leads the author to question the propriety of beginning treatment before the child is ready to walk. Although he appreciates the ossification periods and all the other arguments in favor of early treatment, he thinks that there is not enough gained to justify the continued interference

with the nutrition of the child resulting from severe manipulation and from the pain of stiff apparatus. The excoriations, the strained tendons and ligaments must surely inhibit digestion, and if digestion is inhibited, nutrition cannot proceed satisfactorily. Every effort at the outset of life should be directed to building up the nutrition and the resistive power.

During the preceding year the author refused to treat cases of congenital club foot in young infants, and advised parents to wait until the babies were old enough to walk. During the first eighteen months the milder forms of treatment are advised, such as manipulations by the mother's hand, and the application of a side splint with a soft roller bandage reinforced by adhesive plaster. The maternal instinct will prevent her from worrying the baby to the extent of inhibiting its digestion.

Curtis, A. H.: Two Cases of Actinomycosis of the Skin in Children. (*The Lancet*, October 29, 1904, p. 1,216.)

CASE I. A girl nine and one-half years old had a swelling on the chest for a month; ten days before entering the hospital it ulcerated. There was no recognizable method of her infection. The swelling on the chest was of uneven shape and extended from the whole length of the sternum to the left anterior axillary line and involving the nipple; there were numerous ulcerations about the size of a dime. The swelling was extremely tender, but gave no sensation of fluctuation; the skin over it was purple-red, fading to white at the margin, and the neighboring veins were dilated. Later a second focus of the disease appeared in the left axilla. The purulent discharge from the ulcers increased, and the characteristic yellow grains of actinomycosis became clearly visible. Iodid of potash in large doses seemed to exercise no beneficial effect, so the areas were thoroughly curetted by Dr. Raymond Johnson, and diseased skin removed. After this treatment the patient improved rapidly and was about the ward at time of report.

CASE II. A boy of eleven years had had a swelling in the abdomen for one month following a fall. At first there was a white swelling near the navel; later this became red and began to discharge. There was no history pointing to infection. The boy was thin, pale and apparently suffering. In the hypogastric and right iliac regions was an inflammatory swelling in connection with the abdominal wall. The margins were irregular and indefinite, and in the centre were two foci, each over an inch in

diameter, and both soft and fluctuating. The skin was purplish, and from one of the foci a red purulent discharge issued by three sinuses. The adjacent abdominal wall was hard and very tender. The inguinal and axillary lymph nodes were enlarged. Dr. D'Arcy Power operated, removing a large sloughing mass and scraped its bed deep down into the rectus muscle. There was no pus. Sections showed typical actinomycosis. Iodid of potash was given until 90 grains were administered daily; then a new focus was removed, and a few weeks later a third focus of the disease was removed. The iodid seemed to be of distinct value; inasmuch as the growth would increase each time the drug was discontinued. Several months later the boy was in a convalescent home much improved, being able to walk about without discomfort.

Powell, Hugh F.: Two Cases of Septic Arthritis of the Knee Joint Treated by Aspiration. (*The Lancet*, October 22, 1904, p. 1,149.)

CASE I. A four-year-old boy was admitted to the North-Eastern Hospital for Children on July 22d, complaining of pain in the left knee and inability to walk. On July 19th he had first complained and the knee was then swollen, though there was no history of local injury. A septic wound was found on the back of the head, the result of a fall five days previous. No other joint was affected; the temperature was 102.6°F. Aspiration of the inflamed joint withdrew two drams of seropurulent fluid, which on culture showed staphylococcus pyogenes albus. Within three days the temperature was normal and the joint, except for slight stiffness, was natural in appearance in ten days.

CASE II. On July 28th a boy nine years old came into the hospital with the history of having run the prong of a garden fork into his right knee on July 25th. There was limitation of motion and evidence of fluid; one ounce of seropurulent fluid was withdrawn. Culture showed staphylococcus albus and bacillus subtilis. As in the first case, recovery was uneventful, and both patients were walking in three weeks. The only treatment besides aspiration was the use of a back splint and firm bandaging for two weeks.

Powell remarks that these cases are interesting from both a surgical and pathologic standpoint. The staphylococcus albus is thought by Hewlett to be less pathogenic than the aureus, though Cheyne's experience is the contrary.

HYGIENE AND THERAPEUTICS.

Willcox, W. H.: Infantile Mortality from "Overlaying." (*The British Medical Journal*, September 24, 1904.)

Deaths of infants from "suffocation in bed" occur in Great Britain to a number which is astounding. On account of the generally high mortality in infancy and of the share which suffocation has in adding to it, Dr. Willcox reviews the statistics for the decade, 1891-1900. He finds the mean annual deaths of children under five years from this cause in England and Wales, excluding London, are 1,137, or 32.46 per million. For London the mean annual deaths are 612, or 139.44 per million.

The chief method of suffocation is by "overlaying," usually by the parents, but in rare instances other children and even cats have been responsible. The failure to provide cradles or cots for their infants and the drunkenness of the parents are most important factors. The large majority of the cases occur on Saturday and Sunday nights when, unfortunately, drunkenness is commoner.

Marsden, R. W.: Hydrotherapy in Scarlet Fever. (*The Medical Chronicle*, September, 1904, p. 391.)

From his own experiences with hydrotherapy in severe and prolonged cases of scarlet fever, and from his consideration of Reimer's and Leichtenstern's experiences, Marsden is convinced that short cold or cool baths, given regularly and frequently repeated during the period of pyrexia or toxemia, have a very beneficial effect. He believes that the tendency to nephritis is lessened, and that the nervous symptoms are rendered far less severe. The prolonged tepid bath is decidedly injurious, producing a weak pulse or collapse. Instead of the short cold baths at 70° F., with friction, such substitutes as the cold pack with friction, the cold mitten or the rapid ice-rub may be employed.

Graham, Edwin E.: The Non-Susceptibility of the New-Born to Measles. (*New York and Philadelphia Medical Journal*, September 17, 1904)

Graham reports the case of a woman developing measles just one day before the birth of her full-term infant. Although the baby was not isolated, it did not develop measles. Measles may be present at birth, but the chances of taking the disease are very slight up to six months of age. After one year the susceptibility to measles is very marked.

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Original Communications.

THE RESULTS OF DECAPSULATION OF THE KIDNEYS FOR NEPHRITIS IN CHILDREN, WITH REPORT OF A CASE IN A CHILD OF TWENTY-SIX MONTHS.*

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Philadelphia.

In a careful study of American and foreign literature for decapsulation of the kidneys for nephritis, the writer has been impressed with the fact that very few cases in children have been reported, the large majority of operations having been performed upon adults. In this paper, the results of decapsulation for nephritis only, will be considered. Pain in the kidney, movable kidney, and surgical affections of the kidney will not be dealt with.

It seems already proven that such cases are suitable for operation and this paper considers only cases of nephritis uncomplicated by such conditions. The following cases have been found in the literature:—

CASE I.—F. G. Balch (*Boston Medical and Surgical Journal*, 1904, p. 90). Mary B., twelve years old; edema of feet, legs and eyes; some peritoneal dropsy; previous history of measles, mumps and scarlet fever as a child; scanty secretion of urine varying from 10 ounces to 2 ounces in twenty-four hours; albumin, $\frac{1}{2}$ to 1 per cent.; urea, 3.59 per cent.; sediment typical of parenchymatous nephritis; death in five days after operation. Case would probably have died if not operated on.

CASE II.—Francis H. J., thirteen years old; scarlet fever at four years with edema of face and legs during convalescence, symptoms persisting for two weeks; never strong after scarlet fever; was known to have nephritis for perhaps nine months before operation. Had a systolic murmur; edema of extremities;

* Read June 20, 1905, at the seventeenth meeting of the American Pediatric Society.

feet cold and clammy; at time of operation, albumin, $\frac{1}{2}$ per cent.; fine and coarse granular casts with fat and renal cells. Operation on April 12th, both kidneys decapsulated. On May 28th, albumin, $\frac{1}{10}$ per cent.; a rare hyaline and finely granular cast. October 15th, no albumin; specific gravity, 1.013; no casts; had slight edema of face and hands two months ago, lasting twenty-four hours. Child evidently much improved since operation.

CASE III.—J. C. Hubbard (*Boston Medical and Surgical Journal*, 1904, p. 94). Boy nine and one-half years old; has had measles, diphtheria and typhoid, not scarlet fever; edema present; urine smoky; acid, 1.010; albumin, $\frac{1}{8}$ to $\frac{1}{4}$ per cent.; many hyaline and granular casts; blood; renal cells; few fatty and epithelial casts. Tapped three times, with death nineteen days after operation.

CASE IV.—Augustus Caillé (ARCHIVES OF PEDIATRICS, 1902, p. 734). Child five years old; chronic parenchymatous nephritis for three years, following an attack of measles. Child not cured by medical treatment. Operated on February 15, 1902, with decapsulation of both kidneys. February 4, 1903, no casts; no red or white cells in urine; albumin, 0.05 per cent. April 16, 1904, specific gravity, 1.021; no albumin; no sugar; no casts. Child pale but in good health.

CASE V.—J. W. Elliott, in the *Boston Medical and Surgical Journal*, 1902, p. 457, reports case of a boy thirteen years old. In the first report, no improvement was noticed, the case being reported shortly after operation. Marked improvement two months after operation. Doing very well seven months after operation. Two years after operation, in good health; no casts, and only a trace of albumin in the urine.

CASE VI.—Dr. E. Willys Andrews (*Annals of Surgery*, 1904, p. 617). Child nine years old with severe, well advanced chronic parenchymatous nephritis. Patient had been watched for some years; symptoms had slowly but progressively grown worse; anasarca extreme; albumin, $\frac{1}{2}$ to $2\frac{1}{2}$ per cent; operation in September. At first there was slight improvement; albumin diminished to 1 per cent. Casts remained numerous; anasarca never improved. Child remained in hospital three or four weeks, then went home, after which the albumin returned to the same amount as before operation. Dr. Andrews considers the case not improved by operation.

CASE VII.—Dr. C. H. Frazier (*University of Pennsylvania Medical Bulletin*, 1903, 1904). Child, aged nine years, had scarlet fever at four years. Nephritis with albuminuria and general anasarca at the age of five. Symptoms disappeared rapidly under treatment; has had two relapses with more or less complete recovery. Chronic parenchymatous nephritis steadily growing worse under best medical care; marked anasarca and ascites; average daily quantity of urine 22 ounces, loaded with albumin and casts. In one week, after first operation on right kidney only, anasarca entirely disappeared, and quantity of urine greatly increased. Two months later, the left kidney was operated on. Child is apparently in good health. It lived in a much improved condition for over a year after the operation, when she took cold, acquired another attack of acute nephritis and died in the course of a couple of weeks. Autopsy was refused.

CASE VIII.—Dr. A. Primrose, in the *Montreal Medical Journal*, 1904, p. 317, reports the case of a boy ten years old, with chronic nephritis; albumin, 1.6 per cent.; numerous hyaline, granular and epithelial casts; paracentesis abdominis performed seven times in the six months preceding the operation. His general health remained good for one year and nine months after decapsulation, when the symptoms of nephritis returned. He improved under treatment. Ten weeks later another acute exacerbation of his nephritis occurred, and a second operation for decapsulation was performed with apparently no benefit. Two months later, another relapse, and one month later, still another relapse. No report as to death or recovery.

CASE IX.—Dr. Primrose also reports a boy eight years old; had measles in infancy; diphtheria seven months before operation. Known to have nephritis two months. No improvement under medical treatment for one month. Specific gravity, 1.040; albumin, 1.5 per cent.; hyaline, fatty, granular and epithelial casts. Right kidney decapsulated. Death fifteen days later from uremia.

CASE X.—Rotch and Cushing (*ARCHIVES OF PEDIATRICS*, August, 1903) report a boy nine and one-half years, with advanced parenchymatous nephritis; albumin, $\frac{1}{3}$ to $\frac{1}{2}$ per cent.; urea, 5 to 9 grams in twenty-four hours; hyaline, granular and fatty casts. Patient steadily growing worse. Symptoms temporarily relieved by decapsulation. Death eighteen days after operation.

The history of my own case, Case XI., is as follows:—Pearl Glickman, aged twenty-six months; family history good; child

was born at full term, raised on the breast and had good health until seventeen months of age, when she had a mild attack of scarlet fever. Three weeks later dropsy developed in face, hands and feet. This disappeared largely, after three weeks of treatment. Two weeks later, dropsy returned and, in spite of systematic and careful medical treatment, persisted. The urine at this period contained a large amount of albumin and many casts. Her condition grew gradually worse, and she was admitted to the Jefferson Hospital October 8, 1904.

On admission the child was pale and the extremities cold and bluish. She exhibited general anasarca, the face being so much swollen that the tips of the eyelashes barely protruded. It was entirely impossible for her to open the lids, and there was peritoneal dropsy. Heart's action rapid; sounds are less distinct than normal; no cardiac murmur; lungs normal. Blood examination made October 9th, is as follows:—

Erythrocytes	3,180,000
Leukocytes	14,000
Hemoglobin	64 per cent.
Color index	1 " "
Polynuclear	89 " "
Small lymphocytes	10 " "
Large lymphocytes	1 " "
Numerous poikilocytes	

She remained under my medical care for a week, and during this time a systematic use of hot baths, diaphoretics, diuretics, laxatives and a liquid diet failed to be of benefit; in fact, the child grew progressively worse, and during the forty-eight hours preceding operation showed distinct uremic symptoms. Death seemed imminent unless a radical change for the better should occur quickly. Dr. W. W. Keen was asked to see the child with the hope that a decapsulation of the kidneys might offer some chance of saving its life. The parents were informed that the child might die under the operation, and their consent being obtained Dr. Keen operated, with the assistance of Dr. Joseph Hearn, on October 15th, Dr. Keen operating upon the right kidney, while Dr. Hearn operated on the left. The edema of the back was so great as to obscure almost entirely the spines of the vertebra. Dr. Keen removed a small portion of the right kidney by transverse incision, the microscopical report of which appears

later in this paper. Both kidneys were a dark purplish color and distinctly larger than the normal. Both capsules were easily separated and pushed thoroughly forward anteriorly and posteriorly.

The child stood the operation remarkably well, chloroform being the anesthetic used. Twenty-four hours after the operation the child showed a most marked improvement, the dropsy was distinctly less in the face, arms and legs. The eyes could easily be opened, and the child was hungry. It was difficult to estimate the total quantity of urine passed in the twenty-four hours, the major portion of it being lost in the child's napkins.

On October 17th, the patient was distinctly better; dropsy almost completely disappeared, and the child sleeps well. Three days after the operation the amount of urine voided was very distinctly increased. On the fourth, fifth and sixth days after decapsulation, the dropsy returned to a moderate extent, the child became drowsy and evidently was not doing so well. Improvement then began, and, with the exception of the period when she was absent from the hospital, January 5 to 18, 1905, there has been no dropsy. Twelve days after the operation she had a slight attack of pulmonary congestion, which rapidly disappeared under treatment.

On October 31st, a small, whitish patch was noticed on the conjunctiva. The child was sent to the out-patient ophthalmological department, and it was found, upon examination, that there were present whitish patches of degeneration in both foveal regions, similar to those of chronic albuminuric retinitis. She was discharged from the hospital January 5, 1905, in very good condition. On January 18th she was readmitted to the hospital with slight edema. She did not receive proper care at home. Under appropriate medical treatment and diet the child rapidly improved, has been in the hospital ever since and, to all external appearances, seems perfectly well.

Dr. Howard Hansell reports, on June 10, 1905, a thorough examination through the medicinally dilated pupil with the electric ophthalmoscope, during ether anesthesia, showing the circulation of the retina to be unchanged from the normal; no hemorrhages or edema to be found, and no pathological changes in the foveal regions.

The child seems perfectly well, is free from all dropsy, is not anemic and is bright and cheerful.

In the study of the subject of decapsulation of the kidneys, it seems advisable first to consider the method by which this operation is supposed to cure. Edebohls claims that a cure is largely brought about by the increased amount of arterial blood which the kidney receives after the operation, and claims to have found postmortem blood vessels of considerable size entering the kidney tissue, the development of such blood vessels being subsequent and dependent upon the decapsulation. Ziegler says: "When a portion of renal epithelia has been destroyed by a morbid process which spares the interstitial structures, the loss is in general, soon made good by regenerative proliferation of the remainder, and if the circulation is adequately maintained, the new epithelia presently become capable of carrying on secretory function."

Edebohls says: "Renal decapsulation is performed with the object in view of creating new and liberal supplies of arterial blood to the diseased kidney. The denuded kidney and its fatty capsule are most liberally supplied with blood vessels. Both are brought together by the operation over the entire surface of the kidney, and new and large blood vessels form between the kidney and the surrounding fatty tissue. The normal capsule of the kidney forms a barrier, of course, to this new supply of blood made possible by a decapsulation."

If this increase of blood supply to the kidneys, which Edebohls claims to occur, actually does occur, then the increased amount of blood carried to the kidney should improve the circulation in the kidney, and assist in removing waste products. The portion of the kidney not diseased would take on an increased function, and the disease might be checked. It is a debatable question, however, whether the newly formed blood vessels going to the cortex from the fatty capsule are permanent. They are probably only temporary, and it is doubtful, therefore, how much increased blood supply is really carried to the kidney after decapsulation.

A factor which probably has considerable to do with the improvement which is noticed during the first few days after a decapsulation is the massage which the kidneys receive at the hands of the surgeon during the operation. It seems plausible to believe that this necessary manipulation temporarily relieves the congestion and inflammation which exists.

There is much, however, in the study of cases operated upon to lead one to believe that the factor which has most to do with the remarkable improvement that is sometimes noticed after de-

capsulation, is the relief of the kidney tension which is brought about by the removal of the capsule. Experimental decapsulation done on animals by W. H. Gifford (*Boston Medical and Surgical Journal*, July 14, 1904) seems to show that "there is a certain amount of intracapsular tension in undecapsulated kidneys, normal or with nephritis. There is an immediate increase in size of decapsulated kidneys, persisting up to one month at least, afterwards; a decrease to approximately normal size complete at the end of six months. The increase in size is due primarily to the increase in blood supply, possibly resulting from the removal of the capsule."

It is now, I think, universally admitted that the decapsulated kidney becomes enveloped in a much thicker capsule than existed previous to a decapsulation, in from three to four months after the operation. Where the kidneys have been really seriously damaged by nephritis, an improvement may be noticed for possibly a few months after the operation, and it seems easy to understand how the improvement could continue after the formation of the new capsule, which, according to the studies of Dr. Johnson, of San Francisco, and others, seems positively to occur in a few months.

The favorable progress which is at times noted during the first few months following the operation takes place, in the opinion of the writer, before the new capsule is formed, and the improvement which has occurred during these first few months may, in certain cases, be sufficient to produce changes of a character that may be more or less permanent. This gain may continue progressively for perhaps some months after the capsule has been reproduced, and possibly be permanent. Wolff believes that the parenchyma of the kidney is never regenerated. The undiseased cells may hypertrophy and take on partially the function of the destroyed cells, but he does not believe that the old cells are replaced by new ones. However, the probabilities of new cell development seem certainly to be infinitely greater in children than in adults.

Evidence seems to be steadily accumulating against the acceptance of Edebohls' theory of increased blood supply in the kidney being the beneficial factor following the operation, and considerable testimony has accumulated pointing to the improvement being due to the relief of renal tension. Whether the latter is or is not true does not alter the fact that certain cases do improve in

a most remarkable manner after the operation, and it is the duty of the physician to study these cases and select those suitable for operation. If it is possible to separate earlier the cases likely to result fatally from those where a favorable prognosis is probable, either etiologically, or by the history of the case, or by the urinary findings, an earlier operation might in these cases show a decided decrease in the total mortality.

Chronic interstitial nephritis associated with arterial sclerosis, perhaps with changes in the heart and liver, does not seem to the writer to offer much prospect of a cure from a decapsulation; the kidney condition in these cases is usually only a part of a general degenerative condition of the entire body. It is possible that a certain amount of temporary improvement in the kidney might follow an operation in these cases, but a permanent cure, or even a lengthening of life, does not seem to be at the most more than possible.

The removal of the kidney capsule in these cases may assist in temporarily checking the sclerosis of the kidney, but the formation of the new capsule in a few months, and the impossibility of a complete cure effected during these months of new capsule formation, seem to argue against a permanent cure in this class of cases. It is, however, not always an easy matter to decide how much of the inflammation is parenchymatous, how much is diffuse, and how much interstitial.

A careful study of the cases operated upon seems to show that if the nephritis is of comparatively recent origin, the urinary evidences of the nephritis being, perhaps, only of some months' duration, and if under the best medical care the case is not improving but growing progressively worse and there is more or less renal insufficiency, in these acute or subacute cases, a rapid improvement may follow a decapsulation. The symptoms in some of the reported cases disappear as if by magic, and the urinary findings show such a marked improvement that there is no doubt that the operation, and the operation alone, is accountable for such improvement; and there is no reason why, in cases of this character, an occasional complete cure might not result. Marked uremic symptoms add greatly to the danger in these cases, and should cause one to give a very guarded prognosis.

A true nephritis is probably rarely, if ever, one-sided. In 500 autopsy records reported by Guiteras, in all nephritis was found to exist in both kidneys. It seems to be the growing practice, in

view of this fact, to operate on both kidneys, although it is the general belief that an operation performed on one of the kidneys assists in the function performed by the other.

Just what part renal mobility plays in the symptoms of the child, it is difficult to say; probably it is a factor of very little importance. If this is true, it makes the successful cases in children all the more noteworthy, as the movable kidney associated with nephritis, albumin and casts in the urine, constitute a distinct class of cases in adults where the operation is followed by good results. In considering the question of mortality, Guiteras, after a careful investigation of 120 cases, gives the following results:—16 per cent. cured; 40 per cent. improved; 11 per cent. unimproved; 33 per cent. deaths. The mortality in chronic interstitial nephritis was 26 per cent.; the mortality in chronic parenchymatous nephritis 25 per cent., and the mortality in chronic diffuse nephritis 75 per cent. Dr. A. R. Elliott, of Chicago (*Medicine*, 1904, page 251), gives the mortality in 76 cases as 47 per cent., including chronic parenchymatous nephritis, and chronic interstitial, the cases showing improvement as 34 per cent.; unimproved 16 per cent.; worse after operation 2.6 per cent, or a total of 65 per cent. not favorably influenced. He is emphatic in his condemnation of the operation.

Both the mortalities of Guiteras and Elliott consist largely, if not entirely, of adult cases. When we come to consider the mortality in children, I find that the results are distinctly better, as is shown later in this paper.

It is important, when possible, to make a careful bacteriologic examination of the urine collected by catheterization of the ureters, for the bacteria present may decide the question of a decapsulation or a nephrotomy.

In considering this question of mortality, it is very important to remember that the large majority of cases reported are hospital cases, and it is just this class of cases where it is extremely difficult to continue careful, systematic and appropriate treatment, many of these children leaving the hospital to return to their homes, where proper treatment is often altogether impossible, and the possible cure, therefore, rendered extremely doubtful. This is well illustrated in my case, where the child did very well in the hospital, was allowed to go home, became rapidly worse and again quickly improved after its return to the hospital.

The mortality of Bright's disease, where there is disease of

the fundus of the eye, is exceedingly high. Dr. G. F. Suker (*New York Medical Journal*, June 14, 1904) says: "It matters not what form of Bright's disease you may consider, the fundus lesions which are of paramount clinical significance are albuminuric retinitis, and neuroretinitis, with or without hemorrhages. This albuminuric retinitis is of the gravest prognostic importance, and that in an inverse proportion to the age of the patient. When present, irrespective of the stage or type of the Bright's disease (excluding the puerperal and scarlatinal types), the operation of decapsulation is absolutely contraindicated. Retinal changes frequently accompany chronic interstitial nephritis, next in frequency the parenchymatous and finally the diffuse variety of Bright's disease. Very seldom in a purely acute nephritis, can a retinitis albuminurica be positively established (not including the puerperal or scarlatinal).

"Patients with albuminuric retinitis rarely live over two years after the retinitis is recognized. Decapsulation only hastens their death, and has not saved a single life in this class of cases that I am aware of. Suker reports 20 cases of decapsulation with retinitis with twenty deaths."

It is a well-known fact that albuminuric retinitis is quite rare in children, and when present, is not nearly so grave a symptom as when present in the adult. Moreover, albuminuric retinitis is seldom seen in the acute forms of nephritis. The number of cases operated upon in children is too small to as yet be able to collect any data in regard to this point, and I have been unable to find any record of the exact percentage of cases of nephritis which show any evidences of albuminuric retinitis. It seems, however, to be rather in the child's favor that retinitis occurs less often than in the adult, and when it does occur, it is not so unfavorable. It probably points to the fact that the kidney lesions in the child are less likely to be associated with other lesions in the body, and hence decapsulation on a child may offer better chance of cure than an operation done in a similar case in an adult.

In my series of 11 cases, there were five deaths, or 45.4 per cent. Of these five deaths, Case VII., operated upon by Dr. C. H. Frazier, lived in a much improved condition for a year and died from an attack of acute nephritis. One case was distinctly improved by operation. There were four probable, or at least possible, complete cures, or 36.3 per cent., namely, Cases II., IV., V.,

and XI. Two cases were not improved. All of the cases would probably have died if not operated upon.

The form of nephritis most benefited by operation is the acute and subacute cases, but only those should be operated upon which are not doing well under appropriate medical treatment. The results in the chronic cases is not favorable. Regeneration of the kidney tissue in the child is more likely to occur, and the kidney lesions in the child are less likely to be complicated by other degeneration in other portions of the body, and hence, improvement possible in the first few months following decapsulation is more apt to be permanent in the child.

The eye ground changes are less significant in the child than in the adult.

It is important to collect statistics from private practice, as the results ought to be better than from cases in hospital practice.

URINARY REPORT OF PEARL GLICKMAN, AGED
TWENTY-SIX MONTHS.

Date.....	10-8-04.	10-14-04.	10-25-04.	11-16-04.	12-10-04.
Color.....	Amber	Amber	Amber	Light amber	Pale yellow
Specific gravity				1.007	1.010
Reaction.....	Acid	Acid	Alkaline	Alkaline	Acid
Albumin	$\frac{1}{4}$ Moist layer	Trace	Present	Decidedly present	0.2% present
Sugar.....	Not found	Not found	Not found	Not found	Not found
Urea.....	1.3%	2.5%	0.5%	1.2%	1.8%
MICROSCOPICAL.					
Crystals.....	Triple phosphates	Not found	Not found	Triple phosphates	Not found
Amorphous.....	Urates	Urates	Urates	Phosphates	.....
Epithelial cells.	Few squamous	Squamous and Columnar	Squamous and Columnar	Squamous and Columnar	Few
Leukocytes	Numerous	Numerous	Numerous	Few leukocytes	Few
Erythrocytes...	Not found	Not found	Not found	.....	.....
Casts.....	Granular	Granular	Granular	Granular	Epithelial Non-granular
	Hyaline	Hyaline	Hyaline	Hyaline	Finely granular Hyaline

Date.....	1-20-05.	2-4-05.	3-8-05.	3-25-05.	6-16-05
Color.....	Straw	Amber	Amber	Light amber	Light yellow
Specific gravity	1.006	1.007	1.014	Not enough urine	1.018
Reaction.....	Acid	Acid	Acid	Acid	Acid
Albumin.....	Decided trace	Decided trace	Faint trace	Not found	Decided trace
Sugar.....	Not found	Not found	.....	Not found	Not found
Urea.....	.7%	.9%	1.6%	2.8%	1.2 grains per fluid ounce
MICROSCOPICAL.					
Crystals.....	Not found	.....	.....	Not found	Not found
Amorphous....	Urates	.....	.....	Few urates	Trace urates
Epithelial cells.	Many squamous	.....	.....	Not found	Not found
Leukocytes....	Many	.....	.....	Few	Very few
Erythrocytes...	.....	.....	.....	.....	.....
Casts.....	Granular	Granular	None	.....	Very few finely granular
	Hyaline	Hyaline	None	.....	Very few

Blood—few red cells. Tube casts not found.

BLOOD REPORT—JUNE 16, 1905.

Erythrocytes 5,220,000
 Leukocytes 9,600
 Hemoglobin (Dare's hemoglobinomita) .. 58 per cent.
 Color index

Differential:—

Polymorphonuclear leukocytes 74 per cent.
 Small hyalin leukocytes 12 “ “
 Large hyalin leukocytes 4 “ “
 Eosinophiles 10 “ “
 Mast cells. Two were found not typical

October 10, 1904.

Patient.—Pearl Glickman, Philadelphia.

Surgeon.—Prof. W. W. Keen, Jefferson Hospital, City.

Specimen.—Tissue from right kidney.

Specimen consists of a small piece of tissue 2.5 cm. in length; weight, 0.6 gm. The tissue mass resembles in shape the quarter

of a sphere and presents three elliptical surfaces of about equal size and shape, the greatest breadth of any one being 0.8 cm. Two of these surfaces are flat, irregular cut planes, showing no special features, and are pinkish in color. The third is smooth, regular and convex, covered with a thin layer of whitish homogeneous tissue and possesses no macroscopic pathologic lesions. The tissue is tough and firm but not hard in consistency.

The specimen was fixed, infiltrated, blocked, cut, mounted and stained according to approved laboratory methods.

Microscopically, sections show a small triangular area possessing the histologic structure of the kidney cortex. The striæ of the medullary rays or the pyramids of Ferrein can be very clearly distinguished from the labyrinth with its numerous malpighian bodies and tortuous uriniferous tubules of varied calibres. One side of this triangular area is convex and bordered by the fragmentary remnants of a distinct layer of fibrous tissue, which evidently was the capsule of the kidney, but has been, to a large extent, stripped away. The other two sides are straight and cut without regard to any structure. The malpighian tufts are the seat of several distinct, but often associated, changes; in some the tuft is abnormally cellular, the new elements possessing the characters of recently proliferated cells. Other glomeruli are rather shrunken and the glomerular space occupied by a finely granular, faintly acidophilic substance, evidently the solid portion of an exudate which before fixation was liquid. Here and there whole glomeruli have dropped out, leaving their capsular nests vacant. The flat cells lining the capsule of Bowman, are at points, desquamated and in other tufts, granular. The epithelial lining of the uriniferous tubules is swollen, cloudy, or granular, and in some places in active desquamation. The cells are, for the most part, cuboidal or low columnar, and where approaching the normal, possess large distinct nuclei; in some areas the cell outlines are distorted and the nuclei indistinct or unrecognizable. At some points, the connective tissue between the tubules is slightly swollen, and in some fields a distinct, but not abundant, intertubular lymphoid cell infiltration is present. Minute blood vessels are fairly abundant in the section, and here and there small areas of rhaxis are present; the latter are more noticeable near the periphery on the convex or capsular side of the section.

Diagnosis.—Acute diffuse nephritis.

DISCUSSION.

DR. HUBER.—Another reason for improvement in some of these cases lies in the fact that quite an amount of serous fluid drains away from the incision. It is on a par with what occurs when incisions are made for the relief of edema. Dr. Peabody has related to me an extremely interesting case where a number of decapsulations were made at varying intervals and he tells me that the capsule was on one occasion restored in six to eight weeks.

I want to speak also of a boy of about ten who was under my care for extensive edema and ascites, with effusion in the pleural cavity whose nephritis followed scarlet fever several years previous. In tapping we found opalescent fluid with milky-fat globules. All sorts of medical remedies were tried without improvement. He had been repeatedly punctured and the limbs enveloped in gauze and much serous fluid drained away. He was tapped several times, and finally, as our remedies were of no avail, Dr. Brewer was requested to do a double decapsulation. He improved wonderfully after the operation, the chylous ascites disappeared without further tapping, and I saw him one year later with no return of the edema, although he still had the evidences of chronic diffuse nephritis.

DR. PISEK (guest).—I would like to add something to the case reported by Dr. Caillé. I saw that case several months ago, now several years since the operation, and the patient is perfectly well.

DR. GRAHAM.—I have only to add that I was very much struck, while studying this subject, to find that in the literature there were reports of only 11 cases of children operated on, while hundreds of adults have been treated. Everything points to the fact that better results might be anticipated in children than in adults, and I want to put in a plea for the operation upon children that are going from bad to worse, that they should be given the benefit of the doubt.

Celluloid Intubation Tubes —Reich (*Münchener Med. Woch.*, June 20, 1905) has made use of celluloid tubes for intubation purposes. They are light in weight, present a perfectly smooth exterior and interior, are elastic, less likely to produce pressure necrosis and permit of a large lumen with the thinnest possible wall consistent with strength and firmness. They are disinfected readily.—*Journal of the American Medical Association.*

INTUSSUSCEPTION IN INFANCY AND CHILDHOOD, WITH COLLECTION OF 1,028 CASES, WITH STATISTICS.*

BY J. H. HESS, M.D.,

Chicago, Ill.

In presenting a paper on so general and interesting a subject, it becomes necessary to select a few of the main topics for discussion to the exclusion of the remainder, except in so far as they are illustrated by the reports of my 3 cases, which are as follows:

CASE I.—Baby N., aged eight months, breast-fed, had diarrhea for several days, recovered spontaneously, and was well for several days prior to present illness.

Present History.—May 2, 1904, had a natural bowel movement about midnight; began to vomit at 5 A.M. Vomiting and crying at intervals until seen at 10 A.M. Enema at 10 A.M., followed by some bloody fecal matter, and flatus; this was followed by straining, crying, and passing of bloody, watery stools.

Physical Examination.—Fairly well nourished, pupils moderately dilated, reacted to light. Mouth and throat, nose and ears negative. Tongue slightly coated and dry; chest negative; abdomen moderately distended and soft, more resistant on right side of median line. On palpation, some gurgling over the small intestines: an elongated, resisting mass could be palpated from region of cecum following course of ascending, transverse and descending colon to about an inch below the left costal arch; this was slightly movable in every direction, considerably so from its terminus in the left hypochondriac region. No tumor could be felt per rectum, but the finger returned covered with bloody mucus. Temperature, 99.6°F.; pulse, 140; respiration, 40. The child was sent to the hospital and was operated upon two hours after the first examination.

Operation.—Anesthetic, chloroform; time, twenty minutes. On entrance to hospital the stomach was washed out, with return of considerable mucus. Enema given returned with great amount of small clots and some fecal matter. A median incision two inches in length was made above umbilicus. The tumor, which was about ten inches in length, extending from the splenic flexure to the cecum, was reduced without traction, except the cecum,

* Read before the Chicago Medical Society, February 8, 1905.

which was brought up into the wound. The cecum and appendix were highly congested and edematous, but were returned without further manipulation, and the wound was closed. Temperature after operation, 100.2° F.; pulse, 130; respiration, 36.

Second Day.—Temperature rose to 103.8° F.; pulse, 138; respiration, 64 at 3 P.M. Water had been given in one-half teaspoonful doses, and one teaspoon of breast-milk at 12, 1 and 2 P.M.; the child vomited shortly after taking each dose with rise in temperature. All feeding except chipped ice was stopped and one-eighth grain doses of calomel and soda were given for two doses, also an oil enema. At 10 P.M. child passed a large amount of flatus.

Third Day.—Temperature rose to 103.2° F., pulse 134, respiration 66 at 2 P.M. Three doses of calomel and soda were given, followed by citrate of magnesia; no food administered except water; child vomited repeatedly throughout the day, and after five doses of magnesia passed considerable flatus.

Fourth Day.—Afternoon rise of temperature 103° F., bowels moved seven times between 1 and 10 P.M., breast milk again being given. Fourth to eighth day, temperature ranged from 100 to 103° F., bowels moved regularly and child continued to improve.

Tenth Day.—Stitches removed. Twelfth day left hospital. Has had no illness of any kind since.

CASE II.—Raymond M., age three years; history negative, except for fact that he has been accustomed to stand on the rear rod of a three-wheeled bicycle and to lean against the seat, in which way he is pulled around the house.

Present History.—April 3, 1905, 8:30 A.M., sudden pain in abdomen, violent in character. Mother says it was so severe that baby stood on his head and she could see a tumor-like mass to the right of the umbilicus; about 10 A.M. began to vomit, returning all food and water, of the latter of which he drank a great deal. Enema contained considerable fecal matter, seen by the writer at 1 P.M.

Physical Examination.—Negative except abdomen. Abdomen flat, no tympanites, an indistinct resistance noticeable in right hepatic region and this part of the abdomen was the most sensitive. The child allowed a thorough examination to be made without crying, only pushing the hand away when it reached this part of the abdomen. Temperature 98.6° F. per rectum, pulse 120, respiration 32, rectal examination negative. At 9 P.M. the findings were the same, except that the mother had given an enema at

4 P.M., which she said returned slightly tinged with blood and contained no fecal matter; there was still resistance in hepatic region but no distinct tumor palpable, no tympanitis. Temperature 99° F., pulse 120, rectal examination negative.

April 4, 1905, 8 A.M., twenty-three and one-half hours after first pain, slight tympanitis, resistance still noticed but no distinct tumor. Temperature 99.4° F., pulse 130, rectal examination negative. Enema given under pressure of three feet returned no fecal matter, but a few bloody mucus pieces about size of apple-seed.

Operation.—Twenty-six and a half hours after onset. Total time forty minutes, incision two and a half inches through right rectus; some free peritoneal fluid, tumor mass lying in region of cecum and extending to hepatic flexure, reduced by pressure from below upward without traction, was easily reduced except last six inches, which was enteric and was decidedly edematous, infiltrated and had its serous surface covered by fibrinous adhesions. This loop was dark blue in color, but circulation was restored by hot compresses; a slight serous tear necessitated three small silk sutures. The invagination began in the ileum as an enteric intussusception about eight inches above cecum; after reduction bowel was replaced and omentum brought down to cover it; abdomen closed in four layers. During operation child wrapped in blankets and surrounded by hot-water bags.

Subsequent History.—Vomiting, which had occurred every ten to thirty minutes before operation, ceased; three hours after operation water was given in teaspoon doses every fifteen minutes. Next day one grain of calomel was administered in one-tenth grain doses, followed by three one-half ounce doses of citrate of magnesia; this was followed in about twelve hours by passage of flatus and shortly after by fecal matter. Nourishment in the way of liquid peptonoids and beef tea were started the day following operation; peptonized milk on second day. With exception of daily fluctuation of temperature between 100° F. and 102½° F., recovery was uneventful and child left hospital on fourteenth day.

CASE III.—Baby G., age four months, breast-fed. On February 23, 1904, history of uneasiness and frequent desire to go to stool. Slight frequent stools, and occasional vomiting since February 20th. During morning of 23d, began to pass bloody mucus and the mother called a physician for first time. First seen at 2 P.M. Child pale, listless, skin moist and pulse rapid, constantly

grunting, passed some bloody mucus from bowel while being examined. The abdomen was flat and a tumor could be felt in the sigmoid region, extending upward. Child taken to hospital and operated upon two hours later.

Operation.—Anesthetic, chloroform; time, about twenty minutes. Tumor extending from cecum to sigmoid region was rapidly reduced and abdomen was closed without further manipulation. Before operation temperature was 104.2° F. per rectum; at 8 P.M., 103° F., pulse 126, respiration 60. Child was given $\frac{1}{100}$ grain morphin and a little water.

Second Day.—Temperature ranged between 100 $\frac{1}{2}$ ° F. and 102° F., pulse 100 to 160, respiration 32 to 48. Child took water but refused breast; sharp, piercing cries, breathing seemed painful, passed flatus at 1 P.M.

Third Day.—Temperature rose to 106° F., pulse 120, respiration 64. Bowels moved three times during day; child grew continually weaker until 4 P.M., at which time it died.

Autopsy.—Heart negative, left-sided bronchopneumonia. At the site of the intussusception some exudate; bowel thickened and hemorrhagic, but no recurrence of intussusception.

For Cases I. and III., I wish to thank Drs. G. J. Hagens and J. S. Hunt respectively, with whom I saw the cases in consultation.

PATHOLOGY (MICROSCOPIC).

In presenting the microscopic findings of our case, one of the ileocecal variety, which was probably one of that class of cases most favorable for surgical interference, and which was operated on within eighteen hours after onset of the first symptoms of invagination, I desire to emphasize the necessity for early surgical interference if we hope for a lowered mortality in this rapidly destructive lesion of the bowel. The mucous membrane and its underlying submucous coat seemed to have borne the brunt of the destructive process in both the ileum (section one-half inch above the ileocecal valve) and the colon (section one inch below the ileocecal valve), which formed a part of the intussusception. The mucous membrane showed areas of marked infiltration, destruction of the glandular elements and several areas of ulceration of the mucous membrane down to the submucous coat and occasionally involving the muscular layer of the bowel. The submucous layer was the seat of hemorrhagic infiltration, separa-

tion of its constituent fibres, with a resulting thickening of the entire coat; in places being from four to eight times its normal thickness. The seat of the round cell infiltration was most marked beneath the ulcerated areas in the mucous membrane. The lymphadenoid tissue forming the solitary follicle and Peyer's patches was greatly increased. In my specimen, in which the peristaltic action of the bowel had been restored, the infant dying on the fourth day following operation from a bronchopneumonia, the circular and longitudinal muscular layers, as well as the serous coats, had undergone little change.

The right lung was the seat of a bronchopneumonia quite generally distributed throughout the middle and lower lobe. The great lesson taught by the unfortunate outcome in this instructive case, I believe, is the necessity for early and radical surgical treatment, though we must remain in doubt as to whether the source of the pulmonary infection was through the respiratory tract direct or by infection taking place through the ulcerations in the bowel. That every hour of delay means an increased danger of absorption of intestinal bacteria, with probable infection in distant organs even when the muscular and serous coats remain intact, while with their involvement the dangers of general or a local peritonitis are only too imminent.

D'Arcy Power reports the various histologic changes exhibited by the portions of intestine involved in an intussusception, in a series of 31 cases, from which I quote. The result of his examination shows that any part of the intestinal wall may be affected, but that one portion usually suffers more than others, and the stress of the affection falls most often upon the submucous tissue and upon the circular layer of muscle. The mucous membrane, too, may be seriously injured, but the longitudinal layer of muscle and the serous coat are the least often affected. The earliest histological changes are correlated with an effusion of blood, but the amount of the extravasation varies greatly, at one time so slight as hardly to displace the tissues, at another time so considerable as utterly to destroy them. The site of the extravasation also varies. It may be in the mucous membrane—and it seems that this occurs in the most acute cases. It is usually in the submucous coat, though it may be in the muscular layers of the serous coat. The extravasation is followed by inflammatory changes, in which the submucous tissue and the circular layer of muscle are chiefly involved. These changes terminate in a hyperplasia of the con-

nective tissue leading to sclerosis, in a tryptic (pancreatic) digestion, leading to the disappearance of every cellular element in the wall of the bowel, and the conversion of its connective tissue into reticulin, in diffuse suppuration or in sloughing of the inflamed bowel, which is then separated and cast off by the ordinary process of ulceration.

ETIOLOGY.

The cause of spontaneous intussusception is unknown, but D'Arcy Power has shown that the width of the large intestine at birth is only a few millimeters greater than that of the small intestine. Before birth its diameter is the same, or even a little less, while at the age of fifteen years it is two and one-half to three times as large. The colon begins to grow in girth directly after birth, though it remains for a time almost stationary in length. The ileum, on the other hand, grows both in length and breadth. The ileum, however, rarely doubles its diameter in the course of its growth, but the large intestine not only often doubles its size, but may even treble or quadruple it. These facts seem to have an important bearing upon the question of the origin of intussusception in young children. The colon is growing in width rapidly and continuously from birth onward, but at about the age of four months, the exact time when spontaneous intussusception becomes common, it also begins to grow in length. The small intestine has grown steadily in length and breadth from the beginning, though the increase in its circumference is less rapid than the increase in its length. During the early months of a child's life, therefore, there is a rapidly increasing disproportion between the transverse diameters of the large and small intestines and physiology teaches that too rapid growth is often associated with perversion of the function, especially when, as in this case, the increased rate of growth affects both the muscular and the nervous tissues. Unduly rapid growth of the large intestine may even allow the end of the ileum to become prolapsed into the colon, and, under suitable conditions, such a prolapse may serve as the starting point of an intussusception. When an intussusception has once been started, the anatomic peculiarities of the individual alimentary tract are of paramount importance, for they determine the character of the intussusception. In the ileocecal forms the colon, with few and simple ileocolic folds devoid of lymphatic glands, will allow the intussusception to run a chronic course even though the amount

of bowel invaginated is very great. Complex fossæ with numerous lymphatic glands at the ileocolic angle and prolongations of mesentery along the wall of the ileum will, no doubt, so far steady this portion of the small intestine as to render its invagination less likely, though, should it occur, the additional amount of tissue invaginated will render the impaction peculiarly tight, so that if gangrene be not produced at once, early adhesions will be formed and the intussusception will soon become irreducible.

The first event in the formation of an invagination of the bowel is an energetic annular tetanic contraction of some portion of the intestine. This contracted area constitutes the fixed point from which the invagination develops. The invagination, however, is not produced in such a manner that the contracted portion of the bowel is forced into the normal intestine situated below this spot by the peristaltic waves coming from above, on the contrary, the invagination is primarily produced by the action of the musculature of the normal portion of the intestine situated below the contracted spot. It is probable that the longitudinal muscles of the intestinal wall of the piece of intestine are chiefly active, and that they pull the normal intestine situated below the point of spastic constipation upward over the contracted piece of bowel.

When the process of invagination has once started, and particularly when it exceeds physiologic limits, it is enforced and reinforced by the same factors that initiated it. It is quite possible that the head of the invagination, after it becomes tightly wedged into the sheath, constitutes the primary irritant which causes further spasmodic constriction of portions of the bowel situated above it, or causes violent peristaltic movements of this portion of the bowel, which, in its turn, carries the incarcerated head downward just as it would propel any other constituent of the bowel contents onward.

In reviewing the literature of the past ten years, I have been able to collect 1,028 cases, reported in a total of over 200 articles; some of these cover a period previous to 1894, but all have been reported since that date, and with the exception of some of Gibson's cases, and a few others, all have occurred under the age of sixteen years. Some of the reports of groups of cases are necessarily incomplete, but in the 314 cases which I have individually collected, and are reported either singly or in small groups, I have been more fortunate in getting details.

Lichtenstein's series are many in adults, but suffice to say that of 593 cases, in 267 there was an absence of a history of the cases and in 111 it developed suddenly in healthy individuals.

Hirschsprung reports 64 cases. One-third of these cases were absolutely healthy up to the time of onset. The majority were suffering from some intestinal disorder. In 14 diarrhea of over ten days' standing preceded the strangulation. In others constipation had been troublesome.

Age is certainly a most important factor, and one on which Power lays particular stress. My series illustrates the predominance of this lesion in the first year of life. Cases in which the age was stated numbered:—

1-3 months.....	8	
3-6 "	75	= 23 per cent.
6-12 "	118	= 37 per cent.
1-2 years	18	} = 60 per cent.
2-3 "	12	
3-4 "	13	
4-8 "	32	
8-18 "	24	
Not given	14	

The two youngest, aged six days each, both died, irrigation only being tried. The remaining five under three months of age, respectively aged eight, seven and eleven weeks, were operated with recovery of the first and last. The remaining two were not operated and died.

In Gibson's cases, 81 were one year or under, and 49 ranged from one to ten years.

Hirschsprung reports 64 cases, of which 46 were under one year, 9 in the second and 9 from two to eight years.

His youngest case was forty-nine days, and of the 46 under one year, 39 were breast-fed exclusively (85 per cent.), only 2 were bottle-fed from birth, and 13 had received other food than milk.

SYMPTOMS.—SKETCH OF THE CLINICAL PICTURE.

The suddenness of the onset is the most striking characteristic of this condition. The remaining symptoms may vary directly or

indirectly according to the degree of the strangulation of the intestinal and mesenteric circulation, and the permeability of the intestinal lumen, and in enumerating them I shall attempt to classify them according to their diagnostic importance. We find a rapid and unexpected development of a train of symptoms reaching their maximum intensity within a short time, more often in a perfectly healthy child, though not infrequently we have a history of some intestinal disturbance or more rarely one of abdominal trauma; they may appear while the patient is at rest, in motion, during feeding, or when asleep. In the majority of cases, the first symptom noted is a sudden violent pain of a colicky character, not infrequently appearing to radiate from a definite point; this is usually shortly followed by vomiting. These two symptoms may be considered to be a constant occurrence in young children. At this time the child usually has one or more bowel movements.

These are usually at first diarrheal in character; later, though not invariably, mucus, blood and mucus, or pure blood, may be passed together with thin liquid bowel contents. At this time, or even earlier, symptoms of marked prostration are invariable and may soon be followed by collapse; the pulse becomes small and rapid, the attacks of vomiting usually recur and may become feculent, by which time usually there is no passage of fecal matter by the anus, though some bloody or mucous material may be evacuated. Tenesmus is frequently a source of great suffering, more especially after obstruction of the bowel has become complete. A rise of temperature in the early stage is rarely observed and the same may be said of advanced degrees of meteorism.

I. *Abdominal Pain.*—This is the first symptom of acute invagination. Its onset is without premonition, colicky in character, usually uninterrupted at the onset, later becoming intermittent; its location varies with the seat of the intussusception. But in children this latter point is of little value, because of their inability to localize it.

II. *Nausea and Vomiting.*—Nausea and vomiting occur either simultaneously with the pain or immediately after. In my collection of 314 cases, in those in which this symptom is noted, vomiting is recorded as being present in 166, absent in 4 cases—the first following a blow on the abdomen, the second a double intussusception comprising a descending ileocecal and an ascending colic; the other two were of the ileocecal variety. All recovered. Four cases had a record of fecal vomiting, two of which

recovered: one by irrigation on the first day; one by laparotomy on the eighth day. Of the other two one died without operation and the other was subjected to a circular enterorrhaphy with a fatal result. In 1 case the vomit was bloody, with recovery.

In 52 cases reported by Martin, vomiting occurred in 89 per cent. Fitz reports its presence in nearly nine-tenths of his cases on the first day, and fecal vomiting in 12 out of 93 cases appearing on or after the fourth day, in all but 2 of his late cases. It may be continuous or occur at intervals; the higher up in the intestinal canal the invagination has occurred the more prompt and constant will be the onset of emesis. The earliest vomiting as seen on the first day may be regarded as reflex.

III. *Evacuations of the Bowels.*—In acute cases we usually have one or more evacuations of fecal matter, which may vary from thin liquid to formed stools, and represent the intestinal contents below the obstruction. After this has passed we have a complete absence of all fecal matter and flatus if occlusion is complete. After the congestion of the intestine becomes more marked and inflammation of its walls begins, we have passages containing blood, serum and mucus. Hemorrhagic evacuations represent one of the most constant symptoms of invagination, present in 156 of my cases in which the history was detailed and absent in only 4 cases. The amount of blood varies from a few streaks to a profuse hemorrhage which may cause death. When the condition becomes subacute the hemorrhagic evacuations may cease transiently or permanently until destruction of the bowel has taken place, when they may again become bloody, contain gangrenous intestinal wall and have a characteristic odor.

IV. *Prostration.*—Prostration sudden in development and out of proportion to the other symptoms present, especially when associated with great pain, little fever and a moderate degree or absence of tympanitis, should lead to the suggestion of a possibility of intussusception.

V. *Tumor.*—The tumor of invaginations is the most important physical sign from the diagnostic standpoint. In 197 cases in which there is a complete history of the case recorded in my collection, 183 give a history of the presence of an abdominal tumor and an absence in 14 cases, with the presence of a rectal tumor in 35 cases and absence of same in 38 cases. In 11 there was an absence of abdominal and a presence of rectal tumor. Martin records presence of a tumor in 79 per cent. out of his 52

cases. Hemmeter records presence of a tumor in 308 out of his 610 cases.

Lichtenstein reports presence of a tumor in 222 out of 433 cases. Raffinesque found it in 24 out of 53 cases of chronic invagination. A tumor may exist and still be too small to be palpated. This is especially true of enteric intussusception. Location of tumor is variable. According to the table of Lichtenstein, the most frequent seat is the region of sigmoid flexure. In my series, 10 cases were in right iliac region, 13 right hypochondriac region, 14 region of transverse colon, 7 in left hypochondriac, 12 in region of descending colon, 24 left iliac region, and 13 in the region of the umbilicus, out of 94 cases in which location was stated. Invagination tumors are relatively very movable, though in rare cases with chronic course they may become fixed and immovable by adhesion.

VI. *Meteorism*.—The tympanitic distention of the abdomen depends on the degree of obstruction of the intestinal lumen, upon seat of invagination, and upon the presence of diarrhea. Meteorism is usually late in developing and its absence is of diagnostic import.

VII. *Tenesmus*.—Tenesmus is much more frequently present than is meteorism, being especially severe in intussusception of the sigmoid region and the rectum. Martin reports its presence in 77 per cent. of his cases.

VIII. *Condition of the Abdomen*.—Aside from the comparatively rare tympanitic distention already spoken of, there are usually no characteristic symptoms or signs, recognizable on the abdomen superficially. In exceptional cases we recognize the site of the tumor by an elevation as described by the mother in my Case II. In enteric intussusception, there is usually an elevation in the region of the umbilicus.

IX. *Fever*.—Fever occurs in about 40 per cent. of all cases of invagination in which the symptom is referred to, early in the attack. Its presence is to be expected when complications have taken place.

DIAGNOSIS.

I will not attempt to go into differential diagnosis at this time. Phosphorus poisoning, opium poisoning, undescended testicle, appendicitis and thrombosis of mesenteric artery are instances of cases seen by the author which required differentiation from intussusception.

Whenever a child who has previously been in good health, or giving a history of intestinal disturbance, presents the group of symptoms—sudden onset of abdominal pain, bloody stools, slight fever, and a prostration out of proportion to the other symptoms—the possibility of an intussusception should be thought of. These combined with nausea and vomiting are almost a constant picture seen in this condition, and when seen together with tenesmus, suppression of fecal evacuation and flatus, our picture needs only to be completed by the absence of, or a moderate degree of tympanitis, allowing us to feel the presence of an elongated abdominal tumor. And none the less important is the palpation of the tumor per rectum. The diagnosis of a chronic form in the absence of an intussusception tumor presents great difficulties, and in these cases it is of especial importance to most carefully and minutely study the history of the case.

PROGNOSIS.

The course of intussusception in the great majority of cases in adults is acute, in the small minority it constitutes a chronic disease, in infancy and childhood the disproportion is even greater. Experience teaches that the fatal termination is the most frequent and therefore the prognosis is grave, because of the many factors which we encounter and which tend to delay the proper therapeutic procedures necessary to a successful outcome in their treatment. Rapid in onset, more rapidly progressive, they demand a properly directed, judicious and radical treatment. I believe that the prognosis depends to a great extent upon the individual treatment of each case, which calls for a most careful consideration not alone of the patient and conditions he presents, but also of the hygienic surroundings and the preparation of the physician to give his patient the most modern methods at his command.

In summing up the data which I have at hand, I hope to produce convincing evidence of the lowered mortality which goes hand in hand with the advent of improved surgical technique and its early application in cases of intussusception.

Of a total of 1,028 cases collected, 314 are cases reported singly or in smaller numbers throughout the literature of the past ten years, and these I have attempted to classify more in detail: 211 recovered, 103 died—of these 34 recovered under non-opera-

tive treatment, 26 died; 83 were operated and recovered after operation, previous to which a number of attempts had been made to reduce by irrigation, gas, etc., while 36 died under this method of treatment; 69 were cured by laparotomy after one or no attempts to reduce by irrigation, so far as can be ascertained by the histories given, while only 5 cases reported under this method of treatment died. In the remainder the details of treatment were not stated. Of this group of cases we find that 43 per cent. treated by non-operative method died, while 30 per cent. of operative cases following several attempts of irrigation died, and only 8 per cent. of the cases reported following a single or no attempt at irrigation died, showing that the earliest operation with the least manipulation gives by far the best result. Even though we know that many of the fatal cases are not recorded in the literature, thereby apparently lessening the percentage of mortality, which is apt to be misleading, we are still impressed by the great difference in the percentage of mortality, 8 per cent. in the earliest operations and 30 per cent. in the later.

Of the total number of 38 resections recorded, 21 were fatal and 17 recovered; of these 23 were done by suture with 9 recoveries; 10 by the Murphy button with 4 recoveries; one by the bobbin with recovery, and the case of Dr. Jacob Frank with resection of the cecum in a seven months infant with recovery. In this case the union was made by the Frank bone coupler.

Artificial anus was made in 9 cases with 4 recoveries; while in the remaining series of 714 cases collected, of 71 resections, 18 recovered, and of 24 cases of artificial anus, 5 recovered. A most interesting group of cases are those of the small bowel, of which I have a record of 22 out of 314 cases of intussusception, with 11 deaths and 11 recoveries. Of the 11 deaths, 1 was operated on the second day requiring resection, due to gangrene; 8 cases on the third day, 6 of which were gangrene, while the 7th presented adhesions; 2 cases on the fourth day, with adhesions and gangrene. Of the recoveries, 4 were operated on first day, 2 on second, 1 on the fourth, 1 on the fifth, and in the remaining 3 the day of disease was not stated.

When we realize the impossibility of trying to reach the seat of an enteric obstruction without operation we certainly have a strong argument for early operation without manipulation of these cases. Some of the interesting points noted in this series of cases and which affected the prognosis are:—

1. Spontaneous sloughing of intussusception with recovery (1 case).
2. Recurrence after apparent reduction—After irrigation 3 deaths and 4 recoveries, after operation 1 death and 1 recovery. Showing small percentage of recurrence after operation.
3. Invagination irreducible—2 recoveries by resection, 8 deaths.
4. Retrograde intussusception—I with recovery by operation.
5. Bowel in 1 case incised to allow escape of gas, with recovery.
6. Second invagination not found at operation, 2 deaths.
7. Peritonitis—8 deaths.
8. Pneumonia—I recovery, 2 deaths.
9. Tears in peritoneum, with suture—3 recoveries, 2 deaths.
10. Rupture of bowel during reduction—2 deaths.
11. Shock after operation—4 deaths.
12. Convulsions—3 deaths, 1 recovery.

CASES REPORTED DURING PAST TEN YEARS BY
VARIOUS AUTHORS.

Author.	Year.	Total.	Non-surgical.		Simple Reduction.		Resected.		Artificial Anus.		Not stated or other Operations.	
			R.	D.	R.	D.	R.	D.	R.	D.	R.	D.
Gibson.....	1888-1900	187	...	...	80	46	6	26	5	5	6	18
Rudgier.....	.....	.....	.....	.....	.....	.....	11	8	.....	.....	.....	.....
Gorham.....	.....	8	.....	8	.....	.....	.....	.....	.....	.....	.....	.....
Wiggin.....	End 1896	103	16	23	21	24	.....	.....	.....	.....	.....	19
Hirschsprung.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Power.....	1890-1900	65	.....	.....	23	25	1	7	.....	7	.....	.....
Eye.....	1897-1899	21	.....	.....	10	11	.....	.....	.....	.....	.....	.....
Pitts.....	1898-1900	27	.....	.....	21	27	.....	.....	.....	.....	.....	.....
Pitts.....	1894-1898	22	.....	.....	6	22	.....	.....	.....	.....	.....	.....
Bolch.....	1897-1904	8	.....	.....	3	1	.....	3	.....	1	.....	.....
Baun.....	1885	29	.....	.....	4	14	.....	5	.....	6	.....	.....
Wichmann.....	1870-1892	138	.....	.....	.....	.....	.....	.....	.....	.....	41	97
Martin.....	1898	43	6	22	.....	.....	.....	.....	.....	.....	3	12
Clubbe.....	1898	22	3	.....	.....	.....	.....	.....	.....	.....	9	10
Murray.....	1899	16	6	7	18	.....	.....	4	.....	.....	1	2
Barker.....	.....	25	.....	.....	18	.....	.....	4	.....	.....	.....	3
		714	31	60	186	170	18	53	5	19	60	161

SERIES OF CASES COLLECTED BY THE AUTHOR.

Days of Sickness.			Total.	Reduction Non- operative.		Lapar. Reduc- tion after Irrig.		Reduction with- out or Follow- ing One Irrig.		Resection.		Artificial Anus.		Adhesions.	Gangrene.			
	R.	D.			R.	D.	R.	D.	R.	D.	R.	D.	R.			D.		
Not given.....	42	23	...	13	8	14	7	12	...	3	2	...	1	2	5			
1 day	84	10	...	13	3	38	5	47	2	2	2	...	1	6	...			
2 days	40	28	...	4	8	15	10	4	2	3	4	...	3	14	2			
3 "	8	20	...	1	3	1	7	1	...	...	7	...	1	4	1	
4 "	10	6	...	1	2	8	3	...	...	...	1	...	...	5	5
5 "	2	7	...	1	1	...	1	...	...	...	3	1	...	4	3
6 "	2	2	...	...	2	...	...	1	...	...	...	...	1	2	1
7 "	3	3	...	...	1	1	1	1	...	...	1	1	...	2	1
8 "	3	1	...	...	...	1	1	1	...	...	...	1	...	1	...
9 " .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10-12 days.	2	...	...	...	1	...	...	...	...	...	...	...	...	...	...
2-3 weeks	5	...	...	...	...	1	...	2	...	2	...	1	...	2	1
3-4 "	3	...	...	...	...	...	...	...	...	2	...	...	...	1	1
4-6 weeks	5	2	...	1	...	1	1	1	...	2	...	...	...	3	...
3½ months.	1	1	...	...	...	...	...	...	...	2	...	...	...	2	...
1½ years.	1	...	...	...	...	...	...	...	...	1	1	...	...	1	...
	211	103	314	34	26	83	36	69	5	17	21	4	7	49	20			
				43%		30%		8%										

TREATMENT.

We now come to sum up intussusception in its practical aspect, dealing with its treatment, which is of as prime importance to the general practitioner as to the surgeon, for on the former depends the disappearance of the old classification into—first, incarcerated, and second, strangulated forms. In the great majority of cases, neglect of treatment alone carries the bowel to strangulation and is also responsible for the majority of irreducible cases.

For our further consideration we must treat all cases on the basis of their being reducible or irreducible cases.

History of Treatment.—The earliest works of special note on this subject were probably those of Ashhurst, 1874, Lichtenstein, 1873, and Jno. Hutchinson, 1874, although both injections and abdominal sections have been employed for centuries for the re-

lief of this condition. The abdomen was occasionally sectioned in the days before modern surgical technic was discovered, but usually later in the disease with the inevitable result of a suppurative peritonitis and its lethal issue.

Laparotomy in intussusception received a distinct impulse in the eighties when Braun in 1885 and others revived the surgical treatment and more especially advocated early surgical interference.

Irrigation in Intussusception.—Clinical study of a series of cases especially as evidenced by the older authors before surgical interference was safe, has taught us that there is an inherent tendency toward spontaneous reduction before the time of paralysis of the muscular coat and formation of adhesions have rendered it impossible. And it is before decided pathologic changes in the intestinal wall have taken place that we may hope to obtain results by irrigation or other mechanical methods of reduction. Experiments by Mortimer, in 1891, upon the unopened bodies of children, for the most part under two years of age, shows that there was apt to be a cracking of the serous coat of the large intestine when the resultant pressure of the fluid distending the colon is about two and a half pounds, that is to say, when the irrigator is raised five feet above the patient, and this accident usually happens when the irrigator is raised eight feet. Mole arrived at substantially the same results, and as he worked with the abdomen open, he was able to see the exact manner in which the intestinal rupture occurred, as a result of its over-distention. When this accident is imminent, the peritoneal coat of the bowel splits longitudinally for a considerable length; the fluid then begins to leak through the wall of the gut, a small jet issues, and at last, if the pressure be continued, a large rent takes place with forcible expulsion of the contents of the bowel in the peritoneal cavity. Rupture of the large intestine is most likely to occur in the transverse colon at or near the splenic flexure, whilst in the small intestine it takes place in the unprotected portion of the bowel which is situated between the two layers of mesentery.

Mechanical distention should be done under complete anesthesia, combined with gentle external manipulation of the abdomen; the surgeon should be present, and be prepared for incision if irrigation proves unsuccessful, or in case of accident, so that there may be no further delay. If these conditions cannot be met, except under extraordinary circumstances this method of

treatment should not be practised. After apparent reduction by this method the child should be kept under constant observation for recurrences, as incomplete reductions frequently occur and are an indication for immediate surgical procedure.

The Capacity of the Colon.—It is impossible for the surgeon to estimate beforehand the capacity of the colon in any individual case of intussusception, nor can he judge the amount of pressure which may be applied with safety to the inflamed and softened intestinal wall at the neck of the tumor.

Method of Irrigation.—Forty-eight hours is the limit of time within which irrigation is likely to be successful in an ordinary case of ileocecal intussusception with acute symptoms, and in most cases far less than this. And such pressure is alone justifiable in a child of two years, as can be obtained by raising a reservoir of water containing a quart of salt solution at 100° F. two and one-half feet above the anesthetized patient; long continued distention under low pressure is of more avail than rapid dilatation under a high pressure and is far less likely to kink the bowel and thereby prevent the pressure reaching the seat of the invagination. Gentle kneading from below upward aids the irrigation, as possibly does also the inverted position described by Jacobi, with child on its abdomen resting on a soft pillow with hips elevated. The length of an intussusception is no bar to its reduction by irrigation, for many cases are recorded in which an intussusception has protruded beyond the anus. The duration of the symptoms is perhaps always of less importance in an intussusception than their intensity, for a long standing intussusception is often more easily reduced by irrigation than one of comparatively short duration. The longer the time the symptoms have lasted, however, the more likely it is that adhesions will have been formed. Slight adhesions are not an insurmountable barrier to reduction by irrigation, though they militate greatly against its success.

Contraindications to Irrigation.—Abundant hemorrhage would seem to contraindicate any attempt to reduce the intussusception by irrigation. Much extravasation of blood implies destruction of the muscularis mucosæ, infiltration of the submucous tissue, edema of the circular muscle, and consequently a swollen condition of the mucous and submucous layers, with paralysis of the muscular coat. The swollen tissues render reduction difficult, and if the intussusception be reduced, the paralysis of the muscle allows re-

currence to take place, and may thus lead to the loss of much valuable time. Absence of hemorrhage, on the other hand, associated with severe collapse, equally contraindicates the treatment of intussusception by irrigation, for it points to the early occurrence of gangrene.

After-treatment of Cases Reduced by Irrigation.—The after-treatment of an intussusception which has been cured by irrigation must consist in keeping the patient absolutely at rest, in the administration of opiates, and in feeling the abdomen gently from time to time to ascertain that the tumor has not recurred. The following are the disadvantages of intussusception:—

1. Impossible to gauge the amount of pressure.
2. Impossible to exclude presence of serious changes in the bowel wall or the more complicated forms of invagination.
3. Impossible to ascertain when reduction is complete.
4. Injuries of bowel during irrigation heighten the mortality of laparotomy.
5. Delays surgical interference.

Treatment by Abdominal Section.—When invagination after one or more trials under proper conditions has failed to reduce the invagination or only relieved it partially, or there is a suspected recurrence, this method of treatment should in all cases be discontinued and abdominal section performed.

Pitts, in *British Medical Journal*, 1901, reports 49 cases occurring between 1897-1900, in which all except 1 case were treated primarily by abdominal section, the exception being a twenty-four hour case in a seven months infant with resulting cure. He reports twenty-seven deaths and twenty-one recoveries in the remaining 48 cases, a marked lowering of mortality at the St. Thomas Hospital over preceding years. This radical procedure is due to the fact that, in his experience, cases which came to the surgeon have previously been subjected to irrigation repeatedly and this has only too infrequently been done in conjunction with the internal administration of purgatives, which combination has already created a tendency toward collapse.

To Prevent or Minimize Shock.—1. Place child upon a hot water bed or bag.

2. Envelop extremities and chest in cotton, wool, or some equally serviceable protective.
3. Administer a minimum of anæsthetic.
4. Operate with rapidity and caution, with the least possible

exposure and manipulation of viscera, protecting them where possible by hot sponges. This can often be facilitated by making first a small incision, which can be easily enlarged as necessity requires. Another procedure which can be employed profitably in a considerable number of cases, especially those along the transverse and descending colon, is the partial reduction by warm water pressure per rectum just previous to operation, in this way reducing the size of the incision required.

A median incision, beneath the umbilicus, in most cases, answers, but the rectus incision is undoubtedly better, Erdmann's advice on this point being of value. He finds that in most cases going through the right rectus is best, except when the tumor is found in the region of the descending colon or sigmoid flexure. He further states that he has never found it necessary to stitch the gut or mesentery to the parietes for the usually ascribed cause of long, lax mesentery or mesocolon, believing that sufficient temporary adhesions will form as a result of congestion and edema of the gut that is finally extended from the intussusceptions. Shortening the mesentery in cases where there is grave doubt as to the reduction remaining permanent is the simplest procedure.

The method of attempted reduction is of initial importance. Never pull on the entering or proximal end, but use pressure on the apex of the mass through the bowel walls, from below upwards; this will avoid much of the danger of tearing the bowel coats. Slight adhesions can often be broken up by a blunt director applied between the layers, and reduction be accomplished.

Where there is any difficulty in the final reduction, or the condition of the bowel is uncertain, the same should be completed outside the peritoneal cavity. Any serious tears of the serous coat of the bowel should either be remedied by suture or covered by omentum, and suspicious bowel should be treated by such methods as the case suggests.

Difficulties in replacing inflated bowel are of very frequent occurrence, especially in young infants. In such cases the incision should be enlarged early, and not after several vigorous attempts at reduction. By this means they can usually be replaced. Where such a solution is impossible incision or puncture of the bowel may become necessary. With the bowel distended in this manner every precaution should be taken not to include the bowel in the abdominal wall sutures.

TREATMENT OF IRREDUCIBLE INTUSSUSCEPTIONS AND THOSE CASES
IN WHICH THE BOWEL IS MORIBUND.

Congestion and the loss of the bowel's natural gloss, which is so frequently seen in the severer and older cases of invagination, should not cause the surgeon to too hastily assume that the bowel is dead, but rather lead him to test its vitality by pricking it gently, in which case, if only congested, bleeding will take place, or, again, by gently stroking it until its vessels are emptied; the vessels readily refill if the bowel is viable. (Power.)

These points cannot be too seriously considered, as at this stage of the disease we almost invariably find marked prostration, toxemia, etc., and only too frequently is the most insignificant surgical procedure too much for our little patients to withstand, therefore making it imperative that we should undertake the operation necessitating the least manipulation and the greatest chances for recovery.

Pringle, in 1899, suggested one of five methods of procedure in irreducible cases.

(1) Removal or excision of the whole invagination with end to end suture or other union.

(2) Removal or excision of the whole invagination with the establishment of an artificial anus.

(3) Leaving the invagination and establishing an artificial anus above it.

(4) To short circuit the bowel and let the invagination alone.

(5) Suturing the entering piece of intestine to the ensheathing tube at its neck by a continuous suture (other authors recommend an interrupted row of sutures), and then opening the ensheathing tube below the neck to extract the intussusception and to excise it within the sheath (or where possible from below), if accessible through the rectum.

(1) The first method is the ideal one and the end to end anastomosis, with simple suture, is in most cases the most satisfactory. The Murphy button shortens the time, but cannot be used in all cases. For instance, in the large intestine the appendices epiploicae make the two surfaces uneven and irregular. Power recommends packing with gauze about the bowel, with partial closure of the wound, where there is considerable shock and where there is a chance for the restoration of the circulation.

(2) The second method of artificial anus leaves the operation

incomplete, and should only be resorted to in exceptional cases because of the high mortality.

(3) The third method almost invariably results in a permanent fecal fistula, while the gangrenous bowel, remaining in the abdomen, tends to promote further sepsis.

(4) The last objection also applies to this method.

(5) The fifth method proposed by Rydgier is apparently the most practical, but also has its drawbacks in such cases where there are strong adhesions between the invaginated bowel and the returning layer, also a danger of leakage along the thickening mesentery.

Dangers of Incomplete Operation.—Before closure of the abdomen the operator should satisfy himself, with the least possible manipulation, that there are no remaining invaginations or other pathologic conditions which are resulting in obstruction of the bowel, or may cause a recurrence.

Summary of Treatment.—(1) Intussusception demands an early diagnosis and immediate treatment.

(2) Abstinence from all food: far more important, purgation must absolutely be prohibited. The question of sedatives in the form of opium, etc., must rest with the physician.

(3) Irrigation may be tried once or twice under the proper conditions and in properly selected cases.

Conditions:—

(a) Preparation for immediate laparotomy in case of failure.

(b) Complete anesthesia.

(c) Hot salt solution or plain water may be used under a pressure of not more than three feet, the fluid being allowed to remain in the bowel not less than ten minutes.

(4) Contraindications to irrigation.

(a) Recurrence after a previous complete or partial reduction.

(b) The very acute and severe types of this disease, which result in early destruction of the bowel wall, but which cases are fortunately not the most frequent type.

(c) Where there are signs of beginning gangrene or ulceration, evidenced by subnormal temperature, profound toxemia, and other septic symptoms.

(d) Enteric intussusceptions.

(5) Laparotomy should follow failure of irrigation without delay.

(a) Attempted simple reduction from below upward.

(b) In irreducible cases. Resection within the bowel in selected cases, or, where this is not feasible, resection with end to end anastomosis should be attempted where the patient's condition makes it practicable, as an artificial anus or simple packing about the bowel requires a secondary, and only too frequently fatal, operation.

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Clinical Memoranda.

A CASE OF INTERLOBAR EMPYEMA FOLLOWING PNEUMONIA.*

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MEDICAL HISTORY BY DR. TALLEY.

O. S., age 13, female, colored, was admitted to Dr. Musser's service at the Presbyterian Hospital, February 2, 1905. The family history was negative. Previously she had had measles, mumps and whooping cough. The present illness began four days before with a chill in the afternoon, followed in two hours by a second. She complained of pain in the epigastrium, at the base of the right side of chest posteriorly and for the first four hours also in the legs. Considerable cough and rusty expectoration began the day after the chills. On admission the area internal to the left scapula showed harsh breathing and a few crepitant râles, but on percussion this area was more resonant than the right side, and the roughened breathing and crepitant râles were probably due to an early and transient congestion, as there was no further development of consolidation at this point. On the right side anteriorly from the apex to the second rib there was, on percussion, a slight dulness, and to auscultation the breath sounds were harsh. The right base, the first site of severe pain, gave characteristic signs of consolidation a day later, the process having probably begun at the centre and worked toward the surface. Three days after admission the consolidation had reached its maximum; posteriorly, it extended from liver dulness to the apex, and anteriorly, from the apex to the third rib. The crepitatio redux first appeared in the right base on the ninth day, but was delayed in the upper lobe until the twelfth day. This was probably the true crisis, as the respirations, which had been running from 48 to 72, with an average of about 60, fell to 32 and later to the twenties; the pulse, which had been running at about 120, fell to 104, but went up again, and until the operation ran from about 108 to 116. The temperature, which had been running between 103° and 104°, fell only to 102°, and persisted between 101° and 102°. At first we thought the persistence of fever was due to otitis, the patient having complained of pain in both ears on the ninth day, and on

* Read before the Philadelphia Pediatric Society, June 13, 1905.

the tenth day the left ear showed a purulent discharge. The one culture made from the discharge was negative. However, the remittent temperature persisting day after day, even when the otitis showed a tendency to improve, made one think of other causes for its persistence.

The leukocytosis kept in general about the same level throughout. It was 28,800 soon after admission; on the eighth day it was 45,200, the highest count, and this was at the time the otitis began. Nine counts from this time until pus was actually demonstrated in the chest gave an average count of 32,066. Three examinations of the sputum on the twelfth, fifteenth and nineteenth days, showed pneumococci, streptococci, leukocytes, but no tubercle bacilli.

The possibility of an endocarditis was considered, as on admission there was only a very marked systolic murmur, heard best at the pulmonary area. This decided murmur persisted throughout, became more pronounced later, and was supposed to be due to some enforced deviation of the pulmonary artery by the inflammatory process, as the second pulmonary sound was clear, though much accentuated. Later, a well-marked mitral systolic murmur developed, with good transmission, and the apex beat was pushed farther to the left. However, this was probably due to a slight dilatation of the heart, and the murmur was one of relative insufficiency.

The hectic-like temperature, the development of abundant indicanuria, and the whole aspect of the patient, made pus somewhere probable, though the classical sweats and chills were absent.

Repeated examinations of the chest gave no signs of general effusion. The fluoroscope and skiagraph were not used at this time, largely because the patient was in the pavilion apart from the main building, where the x-ray room is situated. Again, the wide-spread consolidation of the pneumonia made the x-ray of doubtful utility in locating any circumscribed collection or collections of pus. Following Musser's rule that "in suspected loculated empyema or effusions the point of puncture should be at the side of greatest dulness and least fremitus," an exploratory aspiration in the seventh interspace, anterior axillary line, was made on the nineteenth day, and only a few drops of clear serum were obtained after penetrating the gristle-like pleura and moving the needle in various directions. A few days later a second aspiration was tried in the eighth interspace, posterior axillary line, and though

the needle penetrated its full length and was moved in various directions, only a little serum, lymph and blood were obtained. Some days later, the conditions remaining the same, Dr. Jopson aspirated the chest in the posterior axillary line opposite the spine of the scapula through the sixth interspace, and after some manipulation of the needle, succeeded in obtaining pus at a depth of about two inches. Dr. Jopson will describe the subsequent operation and the result.

That the process was a loculated empyema and not a pulmonary abscess is best proven by the character of the pus obtained. It showed no pulmonary nor elastic tissue and no cholesterine nor haemotoidine crystals, all or some of which should, according to Osler, Musser, Leube, Strumpel, Eichhorst and others, be obtained in the pus of pulmonary abscess. That it was an interlobar empyema, situated between the upper and lower lobes, appears most likely from our later fluoroscopic and skiagraphic study of the case with Dr. Newcomet. With the fluoroscope even two weeks ago we could still distinctly see the shadow of a consolidation in the right chest. With crosses of lead strips as markers, and careful centering of the anode, we demonstrated that the shadow of the consolidation lay in a line drawn from the junction of the fifth and sixth thoracic vertebra posteriorly to the sixth interspace anteriorly.

A more recent skiagraph, made in as few seconds as possible, with the chest held at rest in full inspiration, shows the shadow on the right corresponding to the fluoroscopic image. Also as we had noted on the screen, a dark area at the right base shows that the pleura is thickened and perhaps resolution incomplete. The by far less marked shadow on the left we could not understand until we recalled from the history of the case, that this area was the very first place where crepitant râles and bronchial breathing were heard, but the process here subsided without running on to full consolidation. It is not unlikely that these less marked shadows are in part at least due to thickening of the pleura. However, the shadow to the right is distinct, and both screen and skiagraph show that it lies in general in the area of the commissure, between the upper and lower lobes.

SURGICAL NOTE BY DR. JOPSON.

The patient was transferred to the surgical ward on the 4th of March, the day following that on which we had succeeded in aspirating the encysted collection. Operation the same day. The

diagnosis was empyema, and no suspicion of an interlobular collection was entertained. The patient's condition was poor; she was exhausted by her long illness, was emaciated, and looked septic. She took ether well. Aspiration in the seventh interspace, posterior axillary line, yielded pus. The incision opened the pleura at this point, the centre of the incision corresponding to the posterior axillary line. There were universal light adhesions binding together the parietal and visceral layers of the pleura, and obliterating its cavity, but no fluid was found, and after separating adhesions for an area of about six inches around the wound no collection was encountered. As we were close to the dome of the diaphragm at this point, and as pus had been withdrawn by deep puncture before incision, we concluded that the diagnosis now lay between an abscess of the lung and a subphrenic collection pushing up the diaphragm, at a deeper level. The aspirating needle was introduced through the lung and pus again found in an upward and backward direction. Two inches of the seventh rib were resected, the lung stitched to the chest wall around the edges of the wound; the needle again introduced into the abscess cavity, followed successively by a grooved director, hemostatic forceps, and the finger, and a large cavity discovered in the posterior portion of the thorax, bounded in front and to the outer side by lung tissue, and posteriorly approaching near the chest wall. Whether any compressed lung tissue intervened between the cavity and the parietal pleura at this point could not be determined. The pleural cavity, anterior to the incision, was packed off with gauze strips, and two rubber drainage tubes of good calibre were inserted into the abscess cavity. After operation the patient reacted nicely under free stimulation. The abscess cavity drained freely. The temperature continued moderately elevated for about six days, when it began to touch normal in the mornings. There was some evening rise, and occasionally slight elevations for several weeks longer, the wound continuing to discharge in decreasing quantity. The tubes were kept in situ for several weeks, being finally removed on April 12th, when the discharge was slight in amount, and thereafter the cavity was drained by a gauze strip. At this time (May) there is a small sinus several inches in length still present, which will probably be some weeks longer in closing. The patient has gained at least twenty pounds in weight, the temperature has been normal for a month, and she seems to be in perfect health.

INFECTIVE ENDOCARDITIS IN A BOY TEN YEARS OLD: RECOVERY.*

BY CHARLES F. JUDSON, M.D.,
Philadelphia, Pa.

Infective, malignant (so-called ulcerative) endocarditis is a rare disease in childhood. Various types of this malady have been described as the septic, typhoid, cerebral and the cardiac, according to the predominance respectively of septic, typhoid, cardiac and cerebral symptoms. The cardiac type of infective endocarditis, which is the most frequent, may run a subacute or chronic course for several months or even a year. Although recovery is extremely rare, several undoubted cases have been put on record. For this reason it seems worth while to report my observation of the disease in a boy aged ten years who recovered after an illness lasting over three months.

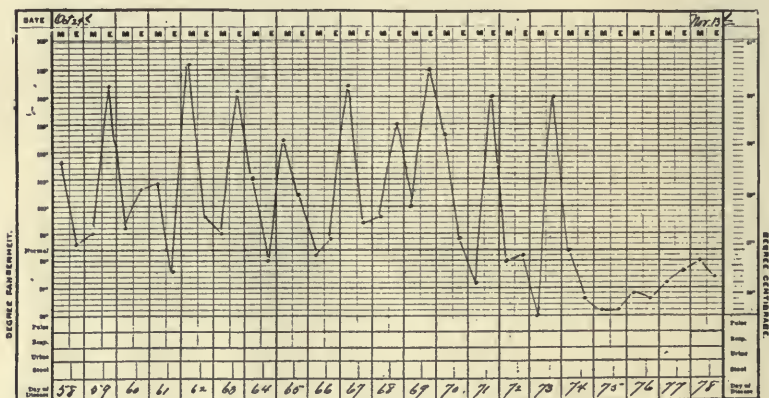
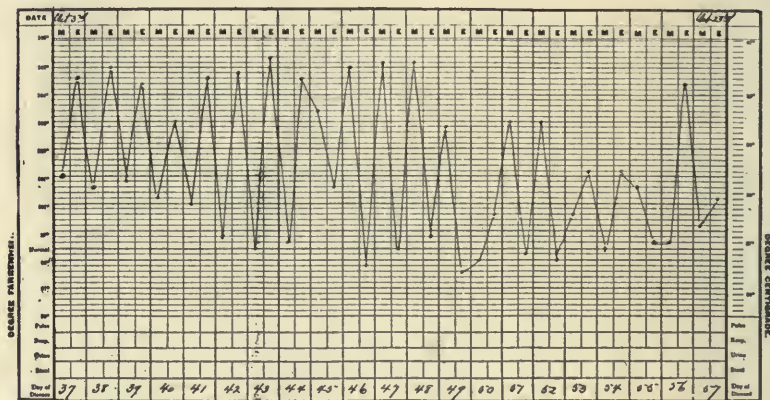
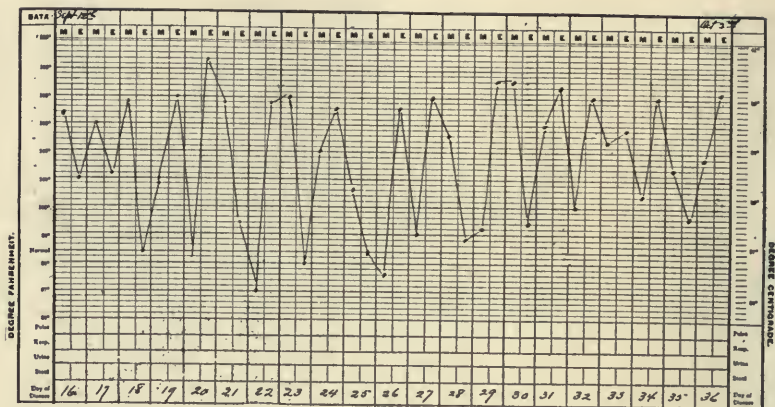
The microorganisms usually found associated with the lesions of acute, infective endocarditis are the staphylococcus, streptococcus and the diplococcus pneumoniae. More rarely we find the typhoid bacillus, gonococcus, diphtheria and tubercle bacillus. Infective endocarditis may be primary or it may complicate septic processes, or it may occur secondarily in the course of the acute infectious fevers, pneumonia and acute rheumatic endocarditis. Rheumatic fever much more commonly gives rise to the ordinary type of endocarditis with verrucose vegetations, but destructive processes of malignant nature undoubtedly occur in this disease.

Ogle has reported 3 cases of this type. Traumatism may rupture a heart valve and lead to ulcerative inflammation. Sclerotic changes in the valves also predispose to this disease. In Coupland's series of 69 cases, 61 showed signs of previous disease; in Kanthack and Tickell's series of 84 cases 68 had old cardiac lesions. The disease is rare in childhood. Of 209 cases collected by Osler only 4 occurred in children. In Osler's series the aortic and mitral valves were affected together in 41 cases, the aortic valves alone in 53, the mitral alone in 77, the tricuspid in 19, the pulmonary valves in 15 and the heart wall in 33. The pulmonary valves were the seat of disease in 4 instances, the tricuspid in 5 instances. Beside the heart lesions and those of the primary dis-

* Read before the Philadelphia Pediatric Society, June 13, 1905.

ease, the most characteristic pathological findings are metastatic abscesses and infarcts due to embolism.

The subject of the present report is Joseph B., a school-boy, ten years old. His mother died of tuberculosis, and two of her children died in infancy, one of marasmus and one prematurely born. Joseph had been well until the present illness, excepting an attack of summer diarrhea, measles and occasional sore throat. Two weeks before his admission to the Episcopal Hospital he suffered from headache and pain in both knees, followed by nausea and vomiting which lasted two days. Chilly sensations were followed by fever of sudden onset. At the same time a masculo-papular rash appeared about the hands and spread over the trunk and limbs. When admitted to the hospital this eruption, which was very profuse, consisted of dull red scattered papules, with here and there a bright red central area, fading partly on pressure and like the lesions of urticaria pigmentosa, leaving behind a discolored brownish spot. The eruption came in crops, caused no itching, and was a prominent feature of the first two weeks of his illness. On admission there was no visible swelling or redness of the joints, but pain was felt on manipulating the knees. The arthritis spread to the left ankle, left elbow and right ankle within the next three days. Two days later the right wrist, metacarpophalangeal joint of right index finger and the first joint of the little finger were involved. The condition of the heart when first examined was fairly good, the action was rapid and regular, and the impulse fairly strong. The apex beat was in the fourth interspace within the nipple line and not diffuse, there was no thrill, the first sound was reduplicated at the apex, and a soft systolic murmur was heard over the whole precordia loudest at the pulmonary cartilage and not transmitted. Cardiac dulness was normal. The lungs were clear. There was no demonstrable enlargement of the liver or spleen, and there were no abdominal symptoms except slight anorexia. The mind was perfectly clear. Cephalalgia was moderate. The urine was passed freely, its specific gravity was 1.010; it contained a trace of albumin, but no casts. The clinical picture and the irregular continued fever suggested at first acute articular rheumatism with involvement of the heart, and salicylates were given freely but with little benefit. The temperature toward the end of the third week of the disease began to show the wide variations of infective ulcerative endocarditis. Slight sweating was noticed, the rash became more dusky in color,



TEMPERATURE CHART IN CASE OF INFECTIVE ENDOCARDITIS.
RECOVERY.

and signs of cardiac dilatation developed. The systolic murmur became louder and rougher. The spleen was demonstrably enlarged. The urine reacted for albumin, and contained many hyaline and a few granular casts. A culture taken from the blood three days after admission and repeated three weeks later gave a diplococcus in pure culture. The leukocytosis was marked, ranging from 20,000 to 34,800. There was from the first marked anemia which became progressively worse. Examination of the eye grounds by Dr. Van Pelt showed no gross changes in the fundus (no hemorrhages or areas of degeneration), but there was slight tortuosity of the retinal vessels, and the margin of the disk was hazy. Intravenous injections of 3-5 cc. collargol in 4 per cent. solution were administered during the fifth week of the disease, besides inunctions of unguentum Crede. In spite of vigorous stimulant treatment the heart became gradually weaker, edema developed about the feet and soon became general, and the long bones were tender on percussion. The red cell count fell to 1,745,000 and the hemoglobin to 21 per cent. on October 8th, in the sixth week of the disease. The urine became scanty and albuminous, with hyaline and granular casts. The patient slept most of the time, and was irritable when aroused. The heart sounds were at times almost inaudible. The seventh, eighth and ninth weeks were marked by extreme prostration, general edema, ascites and scanty secretion of urine, much below the intake of fluids. The fever had diminished in intensity by the eighth week, and intermissions of several hours duration occurred. On the last day of October, the sixty-fifth day of illness, diuresis suddenly set in, with the excretion of ninety-five ounces of urine and continued for one week, causing the disappearance of the edema of the legs and scrotum. Theocin had been given in small doses (2 grains) for five or six days previous to the day when the secretion of urine became copious. Improvement was continuous during the next two weeks. The temperature reached normal on the seventy-sixth day and took but one sudden rise after this, on the seventy-ninth day. The signs of cardiac dilatation had largely disappeared three days later, but a faint systolic murmur was still audible over the base of the heart, with reduplication of the first sound.

The chief points of interest in this case concern the diagnosis and treatment. Although the multiple arthritis suggested rheumatic fever, the typical temperature curve, the marked anemia, the

lesions of the skin, the enlargement of the spleen, and the presence of the diplococcus in the blood indicated clearly that we had to do with a case of infective or ulcerative endocarditis. The infection affected profoundly the cardiac muscle, while the valves escaped with less damage. The occurrence of embolism could not be demonstrated, nor did the severe chills and sweats occur that mark the disease in adult life. Treatment was of little avail, and mainly symptomatic. Arsenic, iron, and quinin were given for long periods, but did not have any specific influence in cutting short the disease, although they seemed to mitigate its severity. Theocin proved of great service as a rapid and powerful diuretic. Three to five cc. of 4 per cent. solution of collargol were injected into the veins of the arm on alternate days for twelve days, but failed to produce marked results. The leukocytosis increased decidedly (from 31,400 to 37,600) after the first injection. The temperature curve was not appreciably influenced by collargol, although the degree of daily variation was less after the first and fourth injections.

At the present time, six months after leaving the hospital, the boy's heart shows traces of his infection in the shape of an indistinct prolonged first sound, followed by a very soft systolic murmur conveyed faintly into the axilla and an accentuated pulmonary second sound, but there is no distinct evidence of hypertrophy or dilatation. The patient has gone back to his usual mode of life, apparently as well as ever, and has no subjective symptoms of heart disease. *

Treatment of Anemia.—Arguing from the standpoint that chlorosis is an intoxication, C. S. Engel (*Zeitsch. f. klin. Med.*, Vol. LIV., Nos. 1 and 2) injected small quantities of the blood of a severely anemic girl into a rabbit, in the hope of bringing about the formation of an antibody. After a certain time, some serum was withdrawn from the animal, heated for half an hour to 58°C. and one cubic centimeter injected into the patient. The reaction following was very severe, but subsequent doses were better tolerated, so that only slight headache was complained after the eighth and last dose. Though the patient had continually lost ground with arsenic and iron medication, she picked up wonderfully during the two months the injections were given, and when seen, a year later, the blood contained 90 per cent. hemoglobin and 4.8 million red cells.—*Medical News.*

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SEPTEMBER, 1905.

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FRESH AIR AND SURGICAL TUBERCULOSIS.

There is perhaps no more difficult problem that comes for decision to the general practitioner with a special interest in children's diseases than the question as to whether so-called surgical tuberculosis in children should be operated on or should be treated by the methods which have proved so successful in recent years for pulmonary tuberculosis. This refers of course not only to tuberculosis of the bones and of joints, but even more particularly to tuberculosis of the lymph nodes, especially to those enlargements of the cervical lymph nodes which used to be

known as scrofula. The experience in France for many years shows that all forms of surgical tuberculosis are quite as amenable to the outdoor-fresh-air-abundant-diet treatment as is pulmonary tuberculosis. The same rules hold with regard to the treatment of the surgical as of the pulmonary form. The earlier the affection is recognized and the sooner and the more completely the child is subjected to the carefully regulated open air life such as is carried out in the best sanatoria, the more surely will the recovery be prompt and permanent.

Enough experience is now at hand to enable us to say definitely that this form of treatment will not only give relief but will produce actual cure and bring better results than the most carefully planned and faithfully executed surgical procedures. Time is required for the success of the treatment. According to the French experience at Berck Sur Mer, at least two years should be allowed and in severer cases where the hereditary tuberculous tendency is outspoken, even three years may be required. Almost from the beginning, however, there is an encouraging improvement that readily enables the physician to insist on the continuance of the methods and parents to recognize the beneficial effects. In this country the experience at Coney Island with the worst cases from some of the orthopedic hospitals of New York, shows how much can be accomplished even for patients in whom the prognosis is not at all favorable.

At the meeting of the National Association for the Study and Prevention of Tuberculosis, held at Washington in May, Dr. Halstead, of the Johns Hopkins Hospital, registered his approval in no uncertain terms of this method of treatment. As he is not one of those who would be at all deterred from the radical use of the knife, if he considered it advisable for his patients, his testimony has all the greater weight. His experience with the outdoor treatment of surgical tuberculosis began fifteen years ago.

He has more confidence in it now than at any time during this period, and some of the cases of cure that he cited show how much can be accomplished even under apparently very unfavorable circumstances. In one case the cervical lymph nodes were so enlarged as to arouse a suspicion of the presence of Hodgkin's disease. The tumor was of enormous size, hard and nodular, and existed on both sides. There was so much discomfort and discouragement that the patient was ready to submit to almost anything, and pleaded for relief so that finally the lymph nodes on one side were entirely removed. After the operation the patient's general health failed, and it seemed inadvisable to proceed to the removal of the lymph nodes on the other side. She was sent up to the mountains with the understanding that she was to live outside in every way, just as if she were a victim of pulmonary tuberculosis. After six months she returned, having gained forty pounds in weight and with the enlargement of the nodes unoperated entirely gone.

The surgical treatment of these enlarged nodes of the neck has never given the satisfaction that was hoped for from it. It is extremely difficult to remove all of the infected material with assurance, and if some of it remains reinfection takes place, a sinus results, and the discharge may continue for a long period. Even after the wound has entirely healed, it is not an unusual thing for it to break down and discharge, if the patient's general health should run down. As Dr. Halstead called especially to attention, these scars in the neck, are always unsightly, and it is in the scar tissue left after the healing of an incision for the removal of tuberculous material that keloidal manifestations are more apt to be seen than under any other circumstances. If these undesirable sequelæ can be prevented, and if the patient's general health can be improved at the same time by an early recourse to the open air treatment for tuberculosis, then we have achieved a great advance in therapeutics.

There are those who will consider that while this rule as to open air treatment holds for surgical tuberculosis, before the formation of an abscess, that is, during the period of round cell infiltration and induration, and before the breaking down of tissue, that it does not hold afterwards. Even this, however, is contradicted by the French experience, by the results obtained among New York children and by Dr. Halstead's details of cases. Sinuses that have been open and discharging for years have closed at Coney Island in a few months. Sinuses of the ankle joint that were known to be intractable, and the only treatment for which was outdoor air and the irrigation of sea water, have done better than with any other remedial measures. Dr. Halstead reported 1 case in which there was an immense abscess filling the pelvis, and occurring in that obstinate form of surgical tuberculosis, sacroiliac disease. This patient was sent to the Adirondacks, gained thirty-six pounds in a few months and returned without any sign of the abscess that had seemed so hopeless of treatment such a short time before.

Patients themselves and parents will ask, is it possible that the fresh air can be drawn so deeply into the lungs that it will cure the diseased bones, joints and lymph nodes? Strange as it may seem this is exactly what it will do, and with more promptness and more completeness than any other form of treatment. It seems not unlikely that if this idea becomes generally prevalent among physicians, we shall see in the next few years as much of an improvement in the morbidity and mortality of surgical tuberculosis as has been recorded with regard to the pulmonary form of the disease during the last decade. One decided advantage will be that these children will not be kept in hospitals, but will be sent to sanatoria in the country where their resisting powers will be increased by the open air life and the need for surgical interference will be correspondingly lessened.

JAMES J. WALSH.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, May 11, 1905.

L. E. LA FÉTRA, M.D., CHAIRMAN.

A CASE OF FRIEDREICH'S ATAXIA.

DR. CHARLES E. NAMMACK presented a young man, twenty-three years old, native born, whose father had died of Bright's disease and his mother from a cause unknown. No history of previous nervous affection in his own or grandparents' families could be obtained. There was no history of tuberculosis, rheumatism or syphilis. The patient denied venereal diseases. At twelve years of age, and five years after a severe attack of diphtheria, there was some unsteadiness in his gait and slight tremor of the hands and his memory became somewhat impaired. There was no marked bladder or rectal trouble. When presented there was a marked drooping of the left shoulder girdle, some slight nodding movements, as well as some swaying of the body. The muscles were neither atrophied nor hypertrophied. The pupils were regular and reacted to light and accommodation. There was no strabismus, ptosis or abnormal eye grounds. There was marked incoordination, particularly shown in the manner in which he reached out for and grasped a glass of water; he hovered over the glass and then grasped it, a sort of "bird of prey" movement. There seemed to be no loss of power in either extremities, but the feet were cold and moist and, to a certain extent, assumed the talipes equinus posture. Knee and elbow jerks were present, but there was no Babinski or clonus. The Romberg sign was marked. The gait was ataxic, but not that of locomotor ataxia. This was the second case of Friedreich's disease that he had ever seen. A peculiar and marked feature was the uncontrollable and impulsive laughter. The speech was monotonous, not the staccato speech of multiple sclerosis.

DR. L. PIERCE CLARK said that Friedreich's ataxia could now be regarded only as a moderately rare disease. There were

several hundred authentic cases on record. The speech in the case presented was very suggestive of that seen in disseminated sclerosis. From an anatomic viewpoint we know that the structure involved in disseminated sclerosis are included in Friedreich's ataxia, namely, the pyramidal or motor system, as well as the posterior or sensory columns. It is, therefore, possible to have all, or nearly all, the symptoms of disseminated sclerosis in Friedreich's ataxia. A few cases of supposed association of the two diseases have been reported. That may be the condition in this case. Certainly these two nervous diseases are not mutually exclusive. They are both degenerative diseases of early life. Instances of the abiotrophy class of nervous affections are described by Sir William Gowers. There is no doubt this patient is suffering from Friedreich's ataxia, but isn't there something more than this disease?

DR. HENRY W. BERG asked whether the lateral curvature preceded or followed the development of the neurotic symptoms, and was told that they had occurred some time after. About eight years ago he said he had presented a case in which the lateral curvature was followed by symptoms similar to those presented by the patient shown by Dr. Nammack. The patient was a girl, about fifteen years old, who had sustained a severe fall with the development of a traumatic lateral curvature, without any fracture of the spine; this lateral curvature developed rapidly, the primary curve high up and the secondary curve low down. At the end of two years an ataxic gait was present, the reflexes were abolished, and she had pains similar to those of tabes, there was no scanning speech, but in many ways the case presented the picture of a disseminated sclerosis, with the sclerosed patches limited to the spinal cord. It was shown at the autopsy that the sclerosis was in the posterior portion of the cord, but most marked at the point of lateral curvature. Dr. Berg believed that while the spinal cord would stand much deviation without undergoing myelitic changes in the vast majority of cases, yet exceptionally a myelitis might occur as a result of the lateral curvature.

DR. JACOB SOBEL said that a very interesting point was the occurrence of the impulsive and uncontrollable laughter, a thing which he had been taught was almost always associated with multiple sclerosis. Dr. Hirsch had recently presented a case of multiple sclerosis at a meeting in which he stated that this disease

was not at all unusual after trauma. There was no question about the diagnosis in this case, he thought; even though several members of the family were not affected, isolated cases do occur.

A CASE OF RETAINED INTUBATION TUBE, TREATED BY GRADUAL DILATATION.

DR. FIELDING LEWIS TAYLOR presented a child who, when three years old, was intubated with tube 6-7 while apparently moribund. This tube had been prepared for another case and there was not a moment to lose. The patient was then revived by precordial massage and artificial respiration. Although a tube of proper size was substituted in forty-eight hours, the injury done by the large tube resulted in cicatricial sclerosis of the subglottic region. Progressive and continuous dilatation with O'Dwyer's tubes was successful, as the child had remained well for more than eleven months. The voice was normal. A tube had been worn 160 out of 187 days of treatment. Rogers' thick-neck-tubes had been tried three times, but were soon coughed out, while O'Dwyer tubes were retained.

DR. HENRY W. BERG said that during the past four or five years they had had as many as 27 cases of retained tubes in the Willard Parker Hospital, one child wearing the tube one and one-half years. Recently they had discharged a child who had worn the tube nine months. When a large tube was introduced a decubitus sore of the laryngeal mucous membrane developed, as the result of the pressure exerted by that tube, and when healing by granulation took place, and tissue formed, there was the tendency for this to contract, a stricture or atresia of the larynx occurred, and this he believed was what caused chronic tube cases. There had been as many as twenty or more autopsies on tube cases at the Willard Parker Hospital, and these so-called decubitus sores and cicatrices were very readily seen. With regard to dilatation of this scar tissue he objected to the use of Rogers' tube as a routine for chronic tube cases, because its thick neck stretched and paralyzed the vocal cords; as a result, autoextubation would occur, necessitating tracheotomy. This in turn can be followed by atresia of the larynx. He thought it was necessary to make a diagnosis as to the exact position of the stricture, and then to devise a tube that will dilate the strictured part; each case requires individual modification of the tube. If this was

done more successes would follow the handling of these chronic tube cases. If any one line of treatment can be laid down for these cases, it is that, in most of them, long continued use of the orthodox O'Dwyer tube for dilatation will result in a cure.

DR. FIELDING LEWIS TAYLOR denied that he had suggested that Rogers' tube was a panacea in these cases, as he had stated that they were expelled three times after a short period while the O'Dwyer tubes were retained. He laid stress on continuous and gradual dilatation of these strictures after they had been located.

TWO CASES OF HYDROCEPHALUS TREATED BY AUTODRAINAGE.

DR. ALFRED S. TAYLOR said that external drainage had never been satisfactory, because of the great danger from infection and early death. Only those methods of internal drainage had been successful which dealt with the drainage of the ventricle into the subdural spaces. He did not approve of the technique of the English surgeons and consequently had devised the operation which he had previously described. He had chosen the right side of the head so as not to endanger the centre of speech or the motor area of the right upper extremity. The brain was pierced through the second temporo-sphenoidal convolution just above the mastoid base so as to enter the body of the lateral ventricle. The first case which Dr. Taylor reported was a child five years old, whose head was 62.5 cm. in circumference, and the tension was so great that at the time of operation the brain protruded three-quarters of an inch. The temperature following the operation went up to 104° and 106° F., where it remained for several weeks. At first improvement was very slow, but it became more rapid after three months. At the present time, thirty-four months after operation, the child is more intelligent, can sing, look at books, knows people by name and shows no evidence of intracerebral pressure.

The second case was a child thirteen months old, who had been born with great difficulty. Beginning at five months of age there had been a rapid, abnormal growth of the head. At the time of operation the reflexes were normal, the head very large and the eyes protruded so that the sclera showed entirely around the iris. Moderate nystagmus was present. In nine weeks the head grew from 49 to 59 cm., *i.e.*, 10 cm. increase in circumference. The child was operated upon, according to his method,

and after eight or ten months the osteoplastic flap had healed by bony union. At first there was no change in the circumference of the head, but after the tenth week the head became asymmetrical and the right side appeared to be smaller. The eyes were normal in their orbits and the nystagmus had disappeared. At the end of eight and one-third months there was no intracranial pressure. Eleven months after the operation the head had grown to 61.5 cm., and the child was beginning to play. At the end of twenty-two months the measurement of the head remained the same, 61.5 cm., and the child could sit up in his chair, play with his toys, look about, understand all that was said to him, and was beginning to talk.

DR. HENRY M. SILVER said that he had operated upon 2 cases, both of whom were doing well. For three days after operation the temperature was 103°F., but it had quickly subsided. He would report the cases in full in the fall.

DR. HENRY KOPLIK thought that this operation should be tried on those cases of meningitis with hydrocephalus, as lumbar puncture was absolutely of no avail in these cases. He said that Dr. Taylor had had very bad material on which to work.

DR. L. PIERCE CLARK said that he had followed Dr. Taylor's cases very closely and had noted a very decided improvement. The improvement seemed to be quite marked soon after operation. If it shall be definitely proven in future that the subdural drainage is permanent the operation can be very advantageously extended to more acute crises in the adult for the relief of intracranial pressure, notably in cerebellar and pontine tumors. Here early relief of intracranial pressure would be a great boon and materially prolong the patient's life.

DR. L. E. LA FÉTRA said that he had originally seen the second case presented by Dr. Taylor and had been impressed by the marked improvement.

DR. TAYLOR closed the discussion. He said that in neither of the cases was there any evidence of active drainage until three months after operation. Probably in neither case would the individual become entirely normal, as, after the brain had been subjected to such distention, it suffered irreparable damage both in the cortex and in the development of the motor tracts. However, the mental and physical condition of both had greatly im-

proved. These cases demonstrated the feasibility and permanence of this type of drainage, but the operation would achieve its best results when applied to cases in the incidence of the hydrocephalus before the pressure damage to the brain had occurred.

INTESTINAL HEMORRHAGE IN A CHILD EIGHTEEN MONTHS OLD.

DR. J. FINLEY BELL reported this case. He said that he had been able to exclude all probable causes except scurvy and ulcer. He thought it must have been due to an ulcer in some part of the small intestines.

DR. HENRY KOPLIK said that he had seen this case in consultation and there were no signs of scurvy except that when he squeezed the bones at the lower extremities the patient winced. He thought the case might be due to scurvy, with beginning enteric catarrh. The gums were pale and there was no ecchymoses. He thought that the case taught that we should not operate unless there was present tumor or other signs of intussusception.

DR. LA FÉTRA said that he wished to emphasize the point that blood in the stools might be one of the earliest signs of scurvy. In this particular case, however, it would seem that the bleeding had occurred from a small ulceration resulting from the attack of ileocolitis.

DR. BERG said that he had hitherto excluded scurvy as a cause when there was but one large hemorrhage from the intestines. But the discussion of this case had shown that there is authority for considering even a single large hemorrhage from the bowels as possibly due to scurvy.

SOME CASES OF CONGENITAL SYPHILIS.

DR. HENRY S. PATTERSON said there was a general belief that the transmission of syphilis from parent to offspring was a limited process; that in the father the transmissibility of the disease died out after the second year and in the mother after the third year. Johnathan Hutchinson went so far as to say that "we may believe that in many instances a period of six months is quite adequate to free a man from the risk of begetting a syphilitic child." This impression was held as the result of the observations of most clinicians, in the large majority of cases, and the

principle was considered much more likely to obtain where the parents had good and continued treatment. Although many physicians had occasionally seen syphilis transmitted to children by parents who had allowed the orthodox period of time to elapse between the primary lesion and marriage, and who had been well treated; still such cases were sufficiently rare and interesting to warrant drawing attention to them at the present time.

CASE I.—C. S., male, first seen August 22, 1904. No history of syphilis in the father could be obtained. Over a period of eight years the mother had had five miscarriages, one after one month of gestation, two after three months, one after four months and one after five, in the order named. The mother gave no other symptoms of the disease, and had never been treated for it. One child of three years had had, at the sixth month, an abscess of the indolent type, but the treatment was not obtainable. The child in question had been perfectly well up to the fourth week, when an eruption appeared on the legs and trunk. The nails began to fall off and for several days before coming under observation the infant had had snuffles and a purulent conjunctivitis of mild type.

Physical Examination.—This revealed excoriated and exfoliating areas on the palmar and plantar surfaces, flattened, copper colored, oval plaques on the arms and legs, of a typical syphilitic appearance; three nails had dropped off, leaving bloody, crusted beds. At this time no evidence of enlargement of liver or spleen were noted.

August 26th. Papules disappearing, plantar and palmar lesions worse.

September 20th. Child looks shrivelled and old, liver enlarged, redness of nose and finger nails necrotic.

October 4th. The visible syphilitic manifestations had cleared up, but the child died with symptoms of meningitis.

In this case there was the story of a woman who had probably been syphilitic for eight years and who at the end of that time was still able to transmit the disease to her child.

CASE II.—In this case the mother had had a primary lesion on the lip in 1898, which was followed by secondary lesions, and in 1899 she had late secondaries, and for two years thereafter she was thoroughly treated by an excellent physician. Meanwhile, in 1900, she married, and in the fall of 1901 had a female child

which was, and has since been, perfectly healthy. Shortly after the birth of her child the treatment was discontinued.

On November 28, 1903, Dr. Patterson saw her for the first time, and delivered her of a perfectly normal child without any lesions. The only suspicious point was that in slipping the cord, which was tightly around the neck, over the head without exerting any unusual force it snapped and the arteries were found to be a little thickened. The placenta was absolutely normal.

On January 12, 1904, the child was again seen, having had an eruption of about ten days.

Physical Examination.—On both thighs and upon the back superficial ulcers, which the mother said began as blisters, some of which were scabbed and had a straightforward syphilitic appearance, were found. On the abdomen extending across the belly were four or five bullæ, ranging in size from a ten-cent piece to that of a quarter of a dollar. On small doses of gray powder, without any local applications, the lesions healed up completely in a few days.

MEASURES FOR THE RELIEF OF SYMPTOMS IN CEREBROSPINAL MENINGITIS.

DR. FRANCIS HUBER read this paper. He gave the statistics of the cases treated at Gouverneur Hospital last year. The deductions from these statistics might be tersely given in the words of Dr. J. C. Wilson: "The mildest cases require no treatment; the malignant react to none. Medicine with all its resources is neither able to combat the attack nor responsible for its results." In considering the treatment we should not lose sight of the large proportion of malignant cases, the grave character of the anatomical changes and the great irregularity in the clinical course. It is impossible to predict the subsequent progress from initial symptoms. The treatment was entirely symptomatic. The case should be isolated in a well ventilated room and general nutrition kept up. An ice bag often adds to the comfort of the patient. The bodily functions should be regulated. Forced feeding through the nose or mouth may be indicated. Chloral per rectum or morphia per os or hypodermatically may be given to relieve pain and restlessness or convulsions. Phenacetin, with or without codein, may be administered to relieve headache. Severe vomiting in the latter stages has been relieved by lumbar puncture, small hypodermics of morphin, ice in the epigastrium and

careful dieting. Sodium benzoate of caffein subcutaneously given relieves pulmonary edema. The iodids were indicated with a view of causing absorption of plastic exudates. Local bleeding by leeches had not given any appreciable results. From 10 to 15 cc. of fluid had to be removed in order to influence intracranial pressure, and not more than 20 or 30 should be taken away unless evidences of pressure are very marked. If there was chronic hydrocephalus repeated tapplings at intervals of a few days were indicated. Taylor's method of auto drainage was employed in 4 cases of chronic hydrocephalus at Beth-Israel Hospital. Sufficient time has not elapsed to judge the final results. Hypodermoclysis was given early to overcome the initial shock and prostration, and possibly to dilute the toxins and later to supply fluid to the tissues.

DR. J. FINLEY BELL mentioned a case of cerebrospinal meningitis that he had seen in Englewood, N. J., in which the pneumococcus was obtained in pure culture.

DR. HENRY KOPLIK said that the prognosis in cases of this disease varied with different epidemics and with the age of the patient. In children below the age of two years it seemed to be invariably fatal. He did not have much faith in the efficacy of lumbar puncture as a curative measure. It was followed in adults by severe headache. Dr. Dana had suggested, in order to relieve this headache, that sterile serum be injected to replace the fluid removed. He thought that the subdural injection of drugs was productive of more harm than good. During the present epidemic he had seen several instances of more than one case in a single family, while in previous epidemics this had not occurred so far as he knew.

DR. HENRY W. BERG related that in 1895 the epidemic had been so gradual in its onset that the existence of an epidemic was only confirmed when he was furnished, on request, with the number of cases that had died from cerebrospinal meningitis. Then it was noted that the number had steadily increased from month to month. During that epidemic he had not seen a single instance of two cases occurring in the same family.

GASTRIC ULCER IN CHILDREN.

DR. WILLIAM LELAND STOWELL said that while gastric ulcer occurred at all ages it was quite infrequent in childhood. He

had recently been called to see a case that presented the appearance of one dying of pneumonia. Physical examination revealed nothing wrong with the chest. The epigastrium was hard and tender to pressure, the abdomen somewhat distended. She had been complaining of headaches since the holidays and had left school on March 13th because of headaches and seborrhea of the scalp. April 10th she complained of pain in the stomach, anorexia and a feeling of weakness. She vomited, and her lips were dry, tongue heavily coated and she had a marked pallor. On April 12th she died after two hours delirium. The autopsy revealed two perforated ulcers upon the posterior surface of the stomach about two inches from the pylorus on the lesser curvature. Each perforation was about one-eighth of an inch in diameter. There was no inflammation. Dr. Stowell reviewed the 35 cases of gastric ulcer in infants and children that were to be found in literature. As to why and how ulcers developed in the stomach, he said that in the newly born the sudden change in circulation might produce venous congestion which was followed by necrosis. Hemorrhagic infiltration and embolism had also been given as starting points. Bacterial necrosis was given a prominent place, and the absence of acid secreting glands near the pylorus accounted for the frequency of ulcers in this locality, the acid being a germ destroyer. The site of the ulcer was usually in the lesser curvature and posteriorly. Welch showed that in 793 cases there were 36.8 per cent. in the lesser curvature, 29.6 in the greater curvature, 12 of the pylorus, 8.7 of the anterior wall, 6.3 of the cardia, 3.7 of the fundus, and 3.4 of the anterior curvature. The symptoms might be absent singly or collectively, or might be latent. Infants gave signs only of indigestion or gastric catarrh, with possibly hematemesis or slightly streaked vomitus. A few have melena. He referred to 1 case where a boy had suffered from epigastric pains after meals for fourteen years, while in other cases there were no symptoms until perforation occurred. Older writers claimed that in gastric ulcer there was an excess of hydrochloric acid, but records at Johns Hopkins Hospital showed free hydrochloric acid in 82 per cent. of the cases, but hyperchlorhydria in only 17.6 per cent. The medical treatment should be simple but varied. Nourishment should be given by the rectum. Food given by the mouth should be peptonized milk or milk with cereal that would not form a hard curd. Alkalies should be given freely. Calcined magnesia, to which might be added bismuth

and cerium oxalate, was beneficial. An attempt might be made to heal the ulcer by giving silver nitrate in solution or in pill to those old enough to take them. Prognosis did not depend upon age. Hematemesis happened at all ages but rarely caused death, except as it aided in producing exhaustion. Perforation in acute cases was usually sudden in symptomatology and resulted in death. In chronic cases there might be inflammatory adhesions with neighboring organs. Hourglass contractions and other scar deformities had not been mentioned in any child cases thus far reported. He said that the number of successful operations in childhood hardly admitted of percentage rating. Dr. Stowell summarized the subject by giving the following percentages:—Five per cent. of all persons dying had gastric ulcer, 20 per cent. of these had more than one ulcer. Forty per cent. occurred in males, 60 per cent. in females. Seventy-five per cent. were cured, judging by the scars found. Eighteen per cent. lasted one year or less, while 46.5 per cent. lasted from one to six years. Three, or 4 per cent., died from hemorrhage, and from 13 per cent. to 6.5 per cent. perforated fatally. Five per cent. died from exhaustion. Fifty per cent. had hematemesis. Forty per cent. of hemoglobin was lost from the blood, and 20 per cent. of the red cells were lacking. Twenty-two per cent. of the cases were latent as to symptoms, and 25 per cent. died without operation. Thirty-nine per cent. was the operative mortality for perforation prior to 1896, and 16 per cent. was the mortality for perforation operations now if done within twelve hours. The operative mortality on chronic cases, according to Moynihan, was 1.3 per cent.

DR. DAVID BOVAIRD, JR., spoke of the different kinds of ulcers seen in infants, the tubercular, the multiple, the so-called round ulcer which corresponded to the round ulcer in adults, etc. The multiple ulcers were associated with a distinct gastritis. These ulcerations were not noticed, as a rule, except on very careful examination. Some observations of Adriance in the autopsy-room of the Nursery and Child's Hospital seemed to indicate that these multiple ulcerations were more frequent than is commonly believed; the speaker himself has found them very rare. These multiple ulcerations, as in Northrup's case, are regularly found in association with gastritis; they present no special or definitive symptoms, and are recognized only at autopsy. The tubercular ulcer is seen only in association

with tuberculosis of the lungs, and is extremely rare considering the frequent opportunities for such infection. The round ulcer, corresponding to the adult type, is, however, rarer than any of the other varieties. Baginsky, in his last edition, speaks of 5 cases reported in literature. Comby and Grancher mention 3, likewise not personal observations. The speaker himself had never seen, either clinically or postmortem, a case of round ulcer in a child. It seemed that, therefore, the round ulcer in childhood belonged in the category of those rare possibilities which from time to time present themselves to the confusion of the practitioner.

DR. FOOTE said that he had been struck by the similarity of symptoms as they occurred in childhood and in adults. He cited two cases from literature to show that the results of treatment are the same as in adults. One patient was a child five years old with peritonitis. An operation was performed for supposed appendicitis, and at the autopsy a perforating ulcer of the stomach was found. Another was a chronic case. A girl of twelve years had suffered for a long time from pain, vomiting and bleeding. At operation the pylorus was found to be adherent to the small intestine and so contracted that it would not admit the little finger. There was also dilatation of the stomach, etc. A retrocolic gastroenterostomy was performed after which she made a good recovery. The treatment of these cases in children should be the same as in adults; that is, immediate laparotomy and suture of perforation of the stomach; gastroenterostomy to avoid the pyloric obstruction in chronic cases. The age of the patient is no counter-indication to operation.

DR. L. E. LA FÉTRA asked Dr. Stowell to sum up the symptoms which would lead him to suspect the existence of gastric ulcer in children.

DR. STOWELL answered that under circumstances similar to those cited he would be unable to make a diagnosis of gastric ulcer. The symptoms are only those of indigestion, unless there be vomiting of blood, which is of very rare occurrence.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, June 13, 1905.

JAMES H. MCKEE, M.D., PRESIDENT.

CONGENITAL HEART DISEASE.

DR. EDWIN E. GRAHAM reported this case, not because congenital heart disease was such a very rare condition, but because the case presented some unusual and interesting signs. The patient, a boy, aged nine months, was the second child, the first child dying during delivery as a result of breech presentation. During the intrauterine life of this child, the mother complained only of dyspnea on exertion. Delivery was easy and not instrumental. When the baby was three weeks old, slight blueness of the lips was noticed. At the age of five months the child had bronchopneumonia which lasted six weeks. Since then cyanosis has always been present, marked in the lips and tissues surrounding nose and eyes, with slight cyanosis of the entire face, distinct cyanosis of fingers, less marked in toes; cyanosis in both hands, and a cold and clammy skin. This cyanosis becomes much more marked at times, the increase persisting from two to twenty-four hours. The cyanosis shows in a much more marked degree in the mouth and tongue than in any other portion of the body.

The child is well nourished, has two teeth, little or no dyspnea, is breast-fed, has no vomiting and no bowel disturbance, is not fretful, and is apparently in good health with the exception of the cyanosis. The apex beat is most distinct just at the nipple. A distinct thrill can be felt over the entire cardiac area; a loud, blowing systolic murmur is heard in the mitral area, transmitted to the axilla, not transmitted to the angle of the scapula. The murmur becomes less on ascending the sternum, is fainter at the aortic cartilage, and still less distinct at the pulmonary cartilage. There is accentuation of the second aortic sound. Both sides of the heart are enlarged, the right being no larger in proportion than the left.

In arriving at the diagnosis as to the probable condition, reasoning from the symptoms, and not from the physical signs, one would be led to suppose the case to be one of pulmonic stenosis, with a probable deficiency in the interventricular septum and possibly a patent ductus arteriosus. In the large majority of cases of congenital heart disease, however, the murmur is at the base

of the heart and not at the apex, the proportion of base murmurs to apex murmurs being about three to one. The large majority of cases of congenital heart disease show more or less cyanosis, and more than one-half of the cases showing cyanosis have been proven postmortem to be cases of pulmonic stenosis. The larger number of cases of apex murmurs associated with cyanosis have been found at autopsy to be cases presenting unusual cardiac malformation, such as transposition of the great vessels, defect in the interauricular septum, or interventricular septum, associated with a patent ductus arteriosus.

Taking all the facts into consideration, it seems that the diagnosis above mentioned is probably correct, that the child has one of the unusual cardiac malformations.

DR. McKEE said that, if his memory served him, one of Dr. Holt's cases of deficient septum ventriculorum had also presented a loud systolic murmur at the apex. In Dr. Graham's patient he thought the pulmonic second sound was markedly accentuated. This might mean a patulous ductus arteriosus. He was inclined to think that this was probably an instance of the triple lesion, pulmonary stenosis, patulous ductus arteriosus and deficient septum ventriculorum. He agreed with Dr. Graham, however, as to the great difficulties in diagnosis.

DR. GRAHAM said that he had made the diagnosis in spite of the absence of physical signs.

DRS. C. F. JUDSON and G. M. ASTLEY showed a girl who had recovered from

ULCERATIVE ENDOCARDITIS.

The full report of this case will be found on page 688 of this issue of ARCHIVES OF PEDIATRICS.

DR. THEODORE LE BOUTILLIER spoke of a child now under his care, with a similar condition. She had endocarditis complicating articular rheumatism, and had been very ill but is now recovering. In this case no blood cultures have been made.

DR. ASTLEY added that the boy had knocked his knee when in swimming and had had pain in the knee before admission. He was sent into the Episcopal Hospital in the ambulance, as a supposed case of typhoid fever, with a high temperature and enlarged spleen. Arthritis developed later in the knee.

DR. A. E. ROUSSEL said that cases of ulcerative endocarditis were very rare, and especially so in children. He believed that the diagnosis was made positive only after cultures had been made from the blood. Dr. Judson's case seemed to be a positive one. But he reiterated the fact that cases of recovery from ulcerative endocarditis are very rare. He reported a case some years ago, in an adult, following miscarriage and septicemia. The patient had over twenty abscesses opened, and streptococci were found in the blood. He thought it difficult in children to obtain sufficient blood to find the bacteria. In his case as much as seven or nine ounces of blood were secured before bacteria were found. In children, from whom only small quantities of blood can be taken, the cocci might not be discovered.

Besides, he said that the right heart was more often involved than is generally believed. It is involved in a relatively larger proportion of cases of ulcerative endocarditis than of simple endocarditis.

DR. A. A. ESHNER said that the microorganisms that cause rheumatism also give rise to other symptoms, sometimes without involvement of the joints, such as tonsilitis, muscular and other pains, or endocarditis. He believed that there might be a "rheumatic septicemia," giving rise to a symptom-complex varying in accordance with the structures involved. Ulcerative endocarditis is to be looked upon as an aggravated form of ordinary endocarditis; therefore it may be concluded that, in a not inconsiderable number of cases, the disease may end in recovery.

INTERLOBAR EMPYEMA.

DR. T. T. THOMAS and J. H. MCKEE reported this case. The patient, a girl of six and one-half years, had been under Dr. McKee's care for about five years. Her history was recorded at some length, the most important point being that she had had two previous attacks of pneumonia. (Catarrhal in infancy, croupous when three years old.) On March 21, 1905, she was seized with headache, chilliness, fever and delirium, and the following day presented the classic physical signs of a lobar pneumonia, affecting the lower lobe of the left lung. The pneumonia ran a moderately severe though ordinary course. On the fifth day she had a pseudo-crisis, and the following day what appeared to be a true

crisis. Contrary to expectations, however, she continued to run an irregular temperature, and had some sweats. On April 2d, there was apparently free fluid in the left pleural sac, and for the next four days the superior level of the same (as evidenced by physical signs) steadily ascended.

On April 7th (sixteenth day of illness) she was seen by Dr. Thomas in consultation. On this day the dulness did not appear to be movable, and operation was deferred.

Then followed a week of improvement, succeeded by a similar period, when the patient's general condition and physical signs remained unchanged. The latter had become largely localized between the anterior and posterior axillary lines, and inferior to the fourth rib.

Two days later (April 23d), slight bulging of the intercostal spaces of the above mentioned region appeared. Dr. Thomas saw her again on the following day, and the diagnosis of empyema (almost certainly interlobar) was concurred in. Exploratory puncture was made at the classic site (seventh interspace), but as was expected a dry tap resulted.

It was decided that she be prepared for operation and anesthetized on the following day, when exploratory punctures might be made until the pus was located. The first aspiration, made in the centre of dull area, secured pus. Dr. Thomas then cut down upon the sixth rib, and excised a piece of it, considerable pus escaping meanwhile. A digital exploration of the cavity found amply verified the pre-operative diagnosis. The pus pocket was drained through two drainage tubes. The patient made an uninterrupted recovery, and on June 1st (five weeks and two days after operation) the wound was closed and dry. The gain in bodily weight was quite rapid, the maximum being four pounds in a week.

DRS. J. E. TALLEY and J. H. JOPSON reported another case of interlobar empyema, following pneumonia. The full report will be found on page 684 of this issue of ARCHIVES OF PEDIATRICS.

DR. GRAHAM said that empyema is commonly overlooked in children. In no disease are the physical signs so easily appreciated, yet for some reason the condition often remains unsuspected for a long time. He has occasionally found an encysted empyema, yet he never made the diagnosis of interlobar empyema. He has seen many cases in children under two and one-half years,

and they have recovered as well without resection of a rib as after that operation. Besides, necrosis of the rib is likely to occur. He prefers incision with free drainage to resection of a rib in young children.

DR. JOPSON said that he practically always resected the rib in children, and believes it the best practice, with the possible exception of infants under eighteen months. Often the large masses of lymph can only be evacuated after resecting a rib. Yet he confessed that many young patients under his care recovered formerly, before resection was so frequently resorted to.

DR. HORACE H. JENKS read a note on

A SERIES OF CASES OF STOMATITIS.

He described the lesions in 11 cases of stomatitis which occurred recently at the Children's Hospital. Ulcers were found in the same places in each case; on the inner surface of each cheek, opposite the molar teeth, at the level of the meeting of upper and lower jaws, and below the lower incisor teeth, at the junction of gum and lip. The ulcers differed from aphthous and ulcerative stomatitis, but more closely resembled the former. They differed from the ulcerative form chiefly in the absence of involvement of the gum, in the absence of foul breath, in the absence of swollen tongue, and in their slower course; and from the aphthous form, in the small number of lesions, there being three only usually; in moderate pain; in larger ulcers being formed by extension from the original focus and not by the coalescence of smaller ones; in their yellowish color and distinct loss of tissue; in the absence of vesicles, and in the fact that they extended deeper than is usual in aphthous stomatitis. In 2 cases what were apparently Klebs-Löffler bacilli were found in the cultures made from the ulcers.

DR. B. F. ROYER said he had seen a number of such cases in the Municipal Hospital. He asked whether any other children in adjoining cribs had developed true diphtheria. He had found in some cases that the organisms were not true diphtheria but pseudodiphtheria bacilli.

DR. JENKS replied that no cases of true diphtheria had developed in the wards at that time. The cultures in these cases were examined by the Philadelphia Board of Health.

The Society then went into executive session.

Current Literature.

PATHOLOGY.

Spiller, Wm. G.: Congenital Spastic Rigidity of the Limbs (Congenital Hypotonia, Little's Disease; Two New Cases with Necropsy). (*University of Pennsylvania Medical Bulletin*, January, 1905, p. 347.)

The author reviews the literature and finds that the classification is not very distinct and that the pathology is vague. Cases of congenital spasticity without microscopic lesions are rare, and in these the microscopic findings are of no value. The author again reports his 2 previous cases (*Journal of Nervous and Mental Diseases*, 1898, p. 81).

CASE I. A girl was born at full term after a difficult labor. When nineteen months old the head measured fourteen and one-quarter inches in circumference. She was unable to sit alone, but could hold objects placed in her hands, though she was an idiot. She had contractures of the muscles of her feet. With the onset of teething convulsions set in. She died at the age of six years. At autopsy the feet were in a position of talipes equinovarus with flexed toes. The head was sixteen inches in circumference. The brain was small but showed no gross lesions. The cord was small. In the paracentral tubules there was a scarcity of the cells of Betz. The fibres of the crossed pyramidal tracts were very fine and seemed undeveloped.

CASE II. A male idiot, had never spoken, could not walk or stand, but could move his legs when sitting. The reflexes were exaggerated. He had convulsions a few months after birth. He died in status epilepticus at eight years. No gross nor microscopic lesions could be found in the brain or cord.

NEW CASES—CASE III. A girl who died at the age of two years and six months. The father had an aunt and an uncle who were mentally deficient. She was born prematurely (seven months) after a difficult labor with forceps. The mother had had two uterine hemorrhages during the pregnancy. The child had increasing insomnia. When a year and a half old she had a convulsion followed by others, often as many as three a day. These involved the entire body and were accompanied by a total loss of consciousness. She never walked but could hold objects.

She never spoke although she expressed joy and pain. Autopsy by Dr. Bronson and the author showed an agenesis of the pyramidal tracts in the cord caused by the premature birth.

CASE IV. A female, aged seventy years, had all limbs paralyzed and had had impaired speech all her life. The body was poorly developed and the arms showed contractures. Sensation was impaired. The lower limbs were very rigid. Babinski's reflex was marked. Her brain was edematous. The bodies of the three upper cervical vertebrae projected backwards and compressed the cord. The posterior columns of the cord were degenerated.

MEDICINE.

Cutler, Elbridge G.: Gastric Ulcer in Children. (*Boston Medical and Surgical Journal*, October 6 and 13, 1904.)

Of this rare condition Cutler presents the abbreviated histories of 26 cases collected from the literature and adds 3 cases from the Massachusetts General Hospital records. The situation in the acute cases was: near the cardia in 5, near the pylorus in 6, midway between in 2 cases and generally distributed in 2 cases. In the chronic cases, near the cardia in 2, near the pylorus in 3, midway in 4, and in 1 case the location was not given. Of the 29 patients, 18 were females, 5 males, and in 6 the sex was not stated. Of the 6 cases occurring soon after birth, the youngest was thirty hours old, and the others were two, five, seven, eleven and fifteen days old, respectively.

The symptoms vary with the age. In infants there are restlessness and hematemesis or melena; there were evidences of pain in one case. In older children dyspepsia or abdominal pain usually precedes the more characteristic phenomena; but even with these, as with infants, there may be no symptoms or merely indisposition before the final collapse. Pain in the epigastrium after food was present in 5 cases, in 1 extremely severe. It usually began soon after a meal and persisted during the whole period of digestion or until vomiting appeared. A violent attack not rarely preceded hematemesis or perforation. A tender spot was frequently found below the end of the xiphoid cartilage, and pressure here was said to excite nausea and vomiting in some instances. Vomiting was present in sixteen instances, usually

not immediately after food. Hematemesis was observed in 6 acute and 5 chronic cases; it occurred shortly after eating and was usually bright blood. The appetite was not much affected, except in several instances where it was increased. Perforation occurred in several of the cases.

Treatment.—Quiet in bed for at least three weeks. Hot fomentations for tenderness. As to diet, infants at the breast may be nursed for a short time every hour if the milk agrees. With bottle-fed children modified milk diluted with barley-water or vichy-water, often best peptonized, may be given. With older children milk should be the main article, but soups, broths, meat extracts, raw or cooked meat-juice, meat jellies and egg white may be alternated with it. Nutritive enemata are valuable in older children. For the pain, opium in some form should be given by mouth in sufficient dosage to meet the indication. Bismuth is useful as in adult cases. Small or single hemorrhages may be disregarded; when profuse or repeated surgical consultation is advised, meanwhile suprarenal extract preparations and saline infusions may be tried. A bland form of iron should be begun early, other tonics being added later. The diet should be regulated for several months after apparent cure.

Fischer, Louis: Clinical Observations in Scarlet Fever, with Special Reference to the Heart and Other Complications, and Therapeutical Suggestions. (*New York and Philadelphia Medical Journal*, December 17, 1904, p. 1160.)

The writer advises paying less attention to the temperature as a guide to the progress of a case of scarlet fever and would watch more carefully the heart, and endeavor to foresee the complications. He believes that, the temperature centre in children being very easily affected, a very mild infection may give a high temperature, while in a severe case with complications it will be scarcely raised. The pulse, heart action and sounds should be carefully observed.

The high mortality of private practice he attributes to the patients getting up too soon, and advises that all cases be kept in bed until the heart is normal, and they should remain indoors six weeks in order that any complication can be watched for and treated.

Free ventilation, anointing with oils, etc., a liquid diet, hot

(115°-120° F.) colon irrigations daily, and free diuresis to favor elimination are recommended.

As to drugs the author uses no antipyretics. As an intestinal antiseptic sodium sulphocarbolate 5 to 20 grains three times daily. For the heart spartein and stropanthus and 5 to 20 drops of a 1-5000 adrenalin solution.

Seibert, A.: Scarlet Fever in New York, and Some of Its Therapeutic Possibilities. (*New York and Philadelphia Medical Journal*, December 17, 1904, p. 1153.)

Dr. Seibert at some length and with the aid of charts and maps shows that the density of and increase of population have very little influence on the number of cases in the affected region, and also that the gradual increase in the number of cases noted during the winter months is due to the continuous intimacy of the school children, while the sudden fall, at the end of June is caused by the closing of the schools.

In the second half of his article he deals with the treatment of scarlet fever and believes that the organism lodges for days in the skin and lymph nodes of the pharynx. He, therefore, treats his patients (over the entire body) with inunctions of ichthyol ointment 5-10 per cent., made with lanolin, repeating two to four times a day. To avoid pharyngitis the author swabs the throat with a 50 per cent. alcoholic solution of resorcin, repeated every two to three hours. He has found that this treatment limits the spread of the disease and mitigates its severity.

Liston, Prosper St. Leger : A Case of Severe Cough and Loss of Weight Due to Round Worms in the Intestine. (*The Lancet*, January 28, 1905, p. 226.)

The patient was a boy thirteen years of age who weighed thirty-six pounds. For some months he had had an intense ear-ache, cough, expectoration, night sweats, and had become extraordinarily emaciated. The expectoration had often been blood-stained. His temperature was 104°F. His abdomen was enormously distended and painful, there was great diarrhea, he had no appetite, and very rarely had more than one hour's rest at night. The family history showed that two sisters had died from some vague stomach trouble. On examining his throat there was found an intestinal worm with its head firmly wedged into the Eustachian opening, and there was great difficulty in pulling it

away, after which the boy experienced immediate relief. Santonin, calomel and scammony were given for a fortnight, and at the end of that time he voided, either by vomiting or per rectum, 603 round worms, varying in length from four to nine inches. After this clearance his cough disappeared, he gained fourteen pounds in weight, and his appetite returned.

SURGERY.

Erdmann, J. F.: Report of a Case of Torsion of an Ovarian Cyst in a Child Thirteen Years Old. (*New York and Philadelphia Medical Journal*, December 17, 1904, p. 1175.)

On Friday, February 5th, the patient was seized with vomiting and generalized left-sided abdominal pain. Previous to this attack she had had several attacks of pain in the appendicular region. Six days later on palpation the pain was diffuse over the lower abdomen, but more marked in the region of the appendix. A mass was felt by rectum. Temperature 100° F., pulse 120. Under ether an irregular mass was felt in the pelvis.

A Kammerer incision was made, and when the peritoneum was opened much bloody serum gushed out.

A large ovarian cyst nearly gangrenous from a twisted pedicle was removed. The appendix was found to be congested and, therefore, was also removed. Complete recovery in fourteen days.

Kennedy, Robert: Further Notes on the Treatment of Birth Paralysis of the Upper Extremity by Suture of the Fifth and Sixth Cervical Nerves. (*The British Medical Journal*, October 22, 1904, p. 1,065.)

Kennedy's original paper appeared in the *British Medical Journal* in January, 1903. The present paper reports later cases as well as results of the early operated cases. As regards the 3 early cases, in one the recovery was complete; in a second, although not operated upon until fourteen years old, there was recovery of forearm flexion to 60°, and of abduction to 45°; while the electrical reactions were returning. In the third case recovery was delayed by what was found at a secondary operation to be compression at the seat of suture by cicatricial tissue.

There were 2 later operated cases, the first being a baby two months old with typical Duchenne's paralysis of the right arm which had not made any improvement whatever from birth.

At four months the child could raise the arm at the shoulder to a slight degree, and at ten months she could use the arm in a fairly normal manner; at eighteen months the arm could be raised to almost the full extent, flexion of the forearm was normal and also external rotations; supination was defective.

The second later case was operated upon when three months old; there was added to the usual type a paralysis of the extensor muscles of the hand, so that the fingers and hand were flexed. At the operation the junction of the fifth and sixth cervical nerves was found buried in a dense cicatrix, and there was an abnormality in the seventh cervical nerve which explained the extensor paralysis of the hand. When eighteen months old the child could abduct the arm to 90° , and flex the forearm to the same degree. Faradic reaction of the affected muscles was normal both to direct stimulation and to stimulation through the nerve in the neck.

As to the influence of the presenting part on the occurrence of the lesion, it may occur with any presentation; in a large majority of the cases the presentation has been cranial.

The lesion is probably produced by stretching of the nerve cords in the neck when the shoulder is forcibly depressed or held back and the head bent to the opposite side and rotated. In this position the junction of the fifth and sixth nerves is under maximum tension, the lower cords being scarcely affected.

In all cases operated upon the lesion involved the junction of the anterior divisions of the fifth and sixth cervical nerves; in one this portion was merely subjected to the pressure of cicatricial surroundings, but in the other cases this portion of the nerve was a cicatricial mass, undoubtedly due to complete rupture. The operation consisted in excising the cicatrix by dividing the fifth and sixth nerves above the lesion, and dividing the suprascapular, the branch to the outer and the branch to the posterior cord below the lesion, and of joining the two central ends to the three peripheral ends by catgut suture. Reunion of the nerve trunks by suture is to be preferred to nerve anastomosis.

As to the most suitable age for operation, the sooner surgical measures are adopted after it is determined that the case will not undergo complete spontaneous cure, the better. The less the nerve has degenerated before operation the more rapid will be the recovery after suture. No operation should be done before two months of age, and not then if improvement is progressive;

on the other hand, operation should not be withheld on account of the age of the patient being well advanced. The improvement made in the case where operation was performed at fourteen years shows that there are possibilities of recovery after even a very long period.

HYGIENE AND THERAPEUTICS.

Decherf, Élie: The Treatment of Acute and Chronic Gastroenteritis by a Diet of Buttermilk. (*Archiv. de Méd. des Enf.*, January, 1905, p. 1.)

The author, who is the physician to a home for infants at Jourcoing, in the north of France, gives his experiences with buttermilk during the epidemic of gastroenteritis in the summer of 1904. He tells of his failure with the water diet and compares his results with those in former epidemics to the great praise of buttermilk.

Any fresh clean buttermilk may be used. A tablespoonful of wheat flour is stirred into a quart of the fresh buttermilk and then boiled slowly in an enamel or porcelain vessel with constant stirring. After boiling for several minutes a dessert spoonful of cane-sugar is added. On standing two layers form, the lower being yellowish and made up of clotted casein, the upper being clear whey. In feeding care should be taken that the nipple holes are sufficiently large for the small curds to pass. The food is given in the same quantity and at the same intervals as any bottle food. At first, however, it is best to give very small quantities, frequently repeated.

The author concludes his interesting paper as follows:—

(1) Buttermilk is usually well borne by infants who take it better than sweetened boiled water, notwithstanding that vomiting at times occurs.

(2) In cases that have not yielded to other régimes and medicines, buttermilk alone produced radical improvement.

(3) Buttermilk is both a specific remedy and an assimilable food for these forms of diarrhea.

(4) It should be used in all forms of gastroenteritis and even in cholera infantum.

(5) Buttermilk gives splendid results in rachitis.

(6) Such a simple, efficient and universally available mode of treatment deserves a wider trial.

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Original Communications.

A CASE OF STENOSIS OF THE PYLORUS IN AN INFANT.*

BY J. CROZER GRIFFITH, M.D.

Philadelphia.

It has been interesting to note the manner in which stenosis of the pylorus in infancy has come into prominence in the medical world. Although Beardsley in 1788 (reprinted by Osler in ARCHIVES OF PEDIATRICS, May, 1903, p. 355). reported a case which was certainly of this nature, little further was contributed upon the subject until Hirschsprung's article in 1888 (*Jahrb. f. Kinderh.*, 1888, Vol. XXVIII., p. 61) directed renewed attention to it. Although reports of cases then began to appear with increasing frequency, it is safe to say that until within a very few years a large number perhaps the majority of physicians were disposed to accept the existence of the condition with great reserve, and certainly to deny the possibility of making a diagnosis. The continued and rapid multiplication of reported cases has now removed all doubt as to the existence of the disease. Regarding the possibility of the making of a diagnosis, not confirmed by autopsy, there is greater question. Nevertheless there are a large number of cases which have recovered yet which have exhibited in the most characteristic way the symptoms present in the fatal cases which have been confirmed by autopsy. My purpose now is to present another instance of this nature.

E. S., male, was born December 25, 1903. He was a well nourished child, weighing ten pounds. In the first two days of life he was constipated, but from the third day, when the milk secretion began, slight diarrhea was present, a watery stool occurring within an hour after nursing. He had been gaining normally in weight. On January 10th, when sixteen days old, he appeared to have indigestion and vomited. On January 12th he seemed stupid, had no appetite, was constipated, and vomited occa-

* Read before the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 19, 1905.

sionally. There was no fever. I saw him for the first time on January 14th. He was still very drowsy. His constipation had been relieved only by the administration of castor oil by injection, which brought away dark colored mucus. I advised that he be taken temporarily from the breast, which appeared to disagree with him, and given barley water. On the afternoon of January 14th, being now three weeks old, frequent vomiting began, all food and medicine being rejected. This condition continued all night. During this night peristaltic movements in the region of the stomach were clearly seen for the first time, a wave passing from left to right, and the stomach appearing to be dilated.

Vomiting continued from this time, the child emptying his stomach four or five times, and sometimes seven or eight times in the twenty-four hours. I saw him again on January 18th, and made the following note:—Vomiting has continued from four to eight times in twenty-four hours. No gas is passed by the bowel as far as has been noticed. Once or twice a day a dark greenish or brownish viscid mucous stool is passed containing considerable bile, following or independent of intestinal douching, but no fecal matter whatever has been discovered. The abdomen is soft; not distended. The stomach is evidently dilated and extends below the umbilicus; active peristaltic movements of it can be seen, the wave moving slowly from left to right. Sometimes only one wave is visible, at other times two or even three can be seen at once, giving the appearance of tennis balls rolling slowly after each other under the skin. This movement is particularly active when the child is approaching an attack of vomiting. Lavage of the stomach is followed by cessation of vomiting, but after a time, as the organ seems to become full, it empties itself forcibly, either in one forcible gush or in repeated small vomitings. It would appear that little if any food passes the pylorus. There is little, if any, fever. The pulse is of fair strength.

For ten days from January 14th the condition continued with but little change, the vomiting occurring less frequently, but no fecal matter whatever appearing in the stools. Various forms of feeding were tried during this period, a mixture of egg-white and whey given in very small quantities frequently repeated appearing to be best tolerated, but all other milk food produced considerable pain. There had been the loss of a pound in weight during the week preceding January 16th, but after this the weight had varied practically not at all.

After January 24th, small fecal masses began to appear at times in the stools, which were passed from four to six times in twenty-four hours, and containing considerable mucus. The

amount of normal fecal matter gradually increased, vomiting was much less frequent, and ceased entirely for a considerable time after February 5th; evidently some degree of stenosis still existed, the peristaltic movements being often visible, and the stomach being decidedly dilated. Lavage was still practised daily, or every other day, according to indications; the diet continued to be of the lightest nature, weight remained unaltered, and the general condition on the whole good. The administration of Keller's malt soup was commenced after about March 5th, and agreed for a time, and a gain in weight commenced at that time.

The condition slowly improved, the child requiring, however, very careful management with changes in diet from time to time. Vomiting returned at intervals; the stomach was still dilated; the peristalsis was often active. Up to about May 1st it seemed evident that some degree of stenosis persisted, but that the trouble now was largely one of impaired digestion. Wet nursing was commenced shortly after this date, and the child continued to improve. He is now a healthy, well developed infant.

A photograph taken at about the age of three months (March 25th) shows well the position and appearance of the peristaltic action, the outlines of the three waves having been sketched on the skin in the position often seen. (See cut on following page.)

This case was at first a puzzling one on account of the distinct evidences of indigestion which were present at the onset, and which continued after the more characteristic symptoms of stenosis had disappeared. It is possible that the symptoms developing on January 10th were those of indigestion merely, and that the actual stenosis did not occur until the afternoon of January 14th. It seems equally possible, however, that January 10th marked the onset of the stenosis. The cause of the obstruction in this case was evidently chiefly spasm, the action of which was probably aided, however, by swelling of the mucous membrane, dependent upon the irritated state of the whole gastrointestinal tract. Possibly, too, some slight degree of hypertrophic change was present. The persistence of symptoms appeared to support this latter view.

I shall make no special reference to the literature of the subject, as this has been well done by many writers, particularly in the papers by Dorning and by Shaw and Elten, read before this society last year (Transactions American Pediatric Society, 1904), and in the excellent article by Wachenheim (*Amer. Jour. Med. Sci.*, April, 1905, p. 636) recently published.

It is customary to divide cases of stenosis into two classes. First, those in which the obstruction depends upon an actual congenital anatomical lesion; viz., a hypertrophy of the tissues of the

pyloric ring with consequent narrowing of the lumen. Second, those in which the stenosis is spastic in nature. It seems perfectly possible that there may be a combination of the two conditions; that with a slight degree of hypertrophic stenosis there may be a temporary spasm, such cases being capable of recovery. It is also possible that temporary swelling of the intestinal mucous membrane may aid in producing closure in either of the classes. We can do little more than theorize on this subject. My own case as I have stated supports the theory that a stenosis chiefly spasmodic may be aided by either of the two other conditions.



PHOTOGRAPH OF DR. GRIFFITH'S CASE OF PYLORIC STENOSIS,
SHOWING PERISTALTIC WAVES.

Two interesting practical points are to be deduced from what is already known of the subject. First, that even undoubted hypertrophic stenosis is capable of being cured by operative interference, 27 per cent. of recoveries according to Wachenheim. Second, that as, however, the mortality is high, we should entertain the possibility of the disease being spastic merely and capable of recovery without surgical aid. To determine how long to wait without delaying so long that operation must be only hopeless in the infant's weakened condition can be determined only by the individual physician in the individual case. The case which I have reported exhibited a stenosis apparently complete for ten days and more or less obstruction for weeks longer. Operation was postponed because the child seemed to tolerate the affection fairly well, and to be maintaining his weight satisfactorily.

TWO OPERATIVE CASES OF PYLORIC STENOSIS IN INFANTS.*

BY THOMAS MORGAN ROTCH, M.D., AND MAYNARD LADD, M.D.,
Boston.

The following 2 cases of pyloric stenosis are reported as being of interest, from the fact that in 1 complete recovery followed after operation, and in the other an interesting postmortem examination was made.

CONGENITAL PYLORIC STENOSIS IN AN INFANT THREE WEEKS OLD. OPERATION. RECOVERY.

This case of pyloric stenosis is worthy to be reported for several reasons.

(1) It is the youngest case in medical literature to be operated upon with complete recovery.

(2) There is only 1 other case reported at this early age. This was one of Thompson's 6 cases which was operated on by Stiles and died in thirty-six hours.

(3) It exemplifies in an absolutely typical manner the clinical features of complete pyloric stenosis.

(4) It contains very strong evidence that complete pyloric stenosis may exist as a congenital condition.

This case was seen by Dr. Ladd in consultation with Dr. Henderson, of Reading, Mass., and with Dr. John C. Munro, of Boston, to whose courtesy we are indebted for the privilege of placing it on record.

D. P., a boy, was three weeks old. He was the second child. The first baby was nursed with absolutely satisfactory results by the mother. The mother had an abundance of milk and was of a temperament well adapted to nursing. The baby weighed at birth ten pounds when dressed, and appeared perfectly healthy. The labor was normal and the mother made a quick convalescence. The baby was put to the breast at the usual time and at two hour

* Read before the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 19, 1905.

intervals. About the time the milk came freely, vomiting began and had continued, not a single feeding being retained. The vomiting occurred usually soon after the nursing, sometimes as much as an hour afterward and was generally expulsive in character. There was no bile in the vomitus. The breast or bottle was always taken greedily, the baby acting as if he were starved. The movements were very small in amount, green in color, and consisted mostly of mucus and a few small specks of matter which may have been fecal, but the amount was so small as to indicate that practically a complete obstruction prevented the passage of the food into the intestines. There was no difficulty in deglutition.

Dr. Henderson had tried various dilutions of the breast milk, condensed milk and water, a 4 per cent. solution of milk sugar, and a 2.5 per cent. solution of lime water. He also had experimented with amounts ranging from one drachm of these various mixtures to 2.5 ounces. The result was always the same—the feeding was not retained. On a few occasions the baby took as much as 2.5 ounces at a feeding which showed that the capacity of its stomach was quite as large as normal, if not larger.

The physical examination showed, so far as could be determined, a child normal in all respects except for a considerable degree of emaciation. It probably did not weigh more than six and a half to seven pounds. The abdomen could not be satisfactorily palpated as the baby cried vigorously when disturbed. Under ether, moreover, nothing abnormal could be felt in the region of the pylorus, but the outline of the distended stomach could be seen through the relaxed abdominal wall. The pulse was 200. The temperature and respirations were normal.

The diagnosis of pyloric stenosis was made from the clinical picture and immediate operation advised. It was quite obvious that the food was not principally responsible for the symptom of vomiting. The practical absence of fecal movements showed that whatever nourishment was obtained could be only a small amount which might come from direct absorption from the stomach itself. This was not enough to prevent rapid emaciation and loss of strength. The indication for exploratory laparotomy was therefore quite clear.

For the next forty-eight hours while the parents were making up their minds whether to risk an operation, it was suggested that a modified milk calling for a 2.00 fat, 5.00 sugar, and 0.75 peptoids should be prepared, peptonized for one hour and given by

rectum every four hours, two ounces at a time. At the same time teaspoonful doses of breast milk were to be given by mouth every hour. The enemata were retained and appeared to give the baby more strength. The teaspoonful doses of breast milk were retained until about one and one-half ounces had been taken and then the whole amount was expelled as usual by vomiting. After that teaspoonful doses of brandy and water were given every hour and were presumably directly absorbed, but larger quantities were vomited. The case was operated on by Dr. John C. Munro at the Carney Hospital. Operation under ether. Median incision. On opening the abdomen the stomach was found considerably distended with gas, and was dilated to about the size seen in a normal infant of three months, with a capacity of about four ounces. At the pylorus was an oval solid tumor approximately three quarters by three-eighths of an inch in diameter. It was situated high up under the liver, which explained the fact that it could not be felt before operation even under full narcosis. A posterior gastroenterostomy was made with clamps and suture, a jejunal loop being used. The jejunum was no larger than a pencil, and by the time the various sutures were placed, three-fourths of the gut were taken up in the anastomosis. An opening easily admitting the finger tip was made. The patient was in fairly good condition at the end of an hour.

The subsequent history and after treatment of the case were as follows:—During the day of operation the patient was given brandy m-x, salt solution $\bar{5}$ -ss per rectum every three hours for two doses; then peptonized milk $\bar{5}$ -i, and brandy m-v per rectum every four hours. Sterile water was given in drop doses by mouth during the night.

On the following day, June 29th, there was a small movement of the bowels with gas. Rectal feeding was continued and peptonized milk was begun by the mouth, beginning with drop doses and increasing gradually. In the afternoon peptonized milk by mouth $\bar{5}$ -iv every two hours was started. The bowels moved three times during the night. From this time on recovery was uneventful, the fecal movements on July 2d being normal in color and consistency. There was very little vomiting and the child gained in weight rapidly. Discharged well on July 17th. At the end of one year the baby was in health and physical development fully up to the standard of the average healthy infant.

PYLORIC STENOSIS IN AN INFANT FOUR WEEKS OLD. OPERATION.
DEATH.

This case was admitted to the Infants' Hospital, Dr. Rotch's service, on January 2, 1905, with the following history:—Vomits a good deal after every feeding. Has never kept down a feeding. Bowels move only with enemata. Movement shown is simply a green, loose movement, with mucus and no fecal matter. Passes water once in five hours.

Physical Examination.—The infant was emaciated. The heart was normal. The lungs were negative. The abdomen was somewhat distended, but was soft and readily palpable. No enlargement of liver or spleen, and no tumors were detected. There was hyperresonance from just below the ensiform cartilage down to the umbilicus. Forty-five cc. of modified milk were given at eleven o'clock. At the time of the examination an hour later, on having the child sit up, the hyperresonance disappeared and was replaced by dulness extending to the level of the umbilicus, evidently from the fluid swallowed at eleven. Hyperresonance returned when the baby was placed flat on its back again. There had been no vomiting since the feeding at eleven. The rest of the physical examination was negative.

January 4th. Vomits occasionally clear fluid.

January 5th. Vomits more than on the first day. Peptonized milk was given by the rectum. Only boiled water was given by mouth.

January 6th. Operation by Dr. Stone.

Medium incision from umbilicus upwards to just above the edge of the ribs. Wound carried through fascia to peritoneum. Peritoneum incised. Stomach found fully distended. Pylorus firm, making a mass about one inch long by three-eighths of an inch in diameter. Below the pylorus the large and small intestines were completely collapsed. The omentum was pushed to the left, the transverse colon pushed back and the first loop of the jejunum drawn forward into the wound. The lowest anterior portion of the stomach was withdrawn from the abdomen and seized with clamps; the jejunum being too small to clamp, was seized with hemostatic forceps at a portion farthest from the mesentery and approximated to the stomach. A running stitch including the peritoneum and muscles was carried along the pos-

terior approximated surfaces. An elliptical piece of the stomach was incised and a longitudinal slit was made cutting the duodenum in front of this stitch; a continuous silk stitch was carried around uniting these openings, and passing through all the layers. The posterior stitch was then continued around through the serous and muscular coats in front of the deep layer of stitches and tied at the starting point. The clamp and walling off gauze were then removed and the area washed off with salt solution. The stomach and the jejunum were returned to the abdomen. The omentum was tucked around the area. The incision was then closed with interrupted silk worm stitches through the entire abdominal wall.

During the operation which occupied about twenty-six minutes from the first incision till the last stitch in the abdominal wall was tied, the child's condition became very bad. Salt solution was given under the skin, and brandy minims 30. At the end of the operation the shock was extreme, the pulse was scarcely perceptible at the wrist, and the respiration were very irregular, jerky and at long intervals. Heaters were applied and the foot of the bed elevated. The extremities were rubbed with warm alcohol. Brandy minims 15 was given subcutaneously after the infant was put to bed.

January 7th. at about nine o'clock, the baby began to vomit a bright watery fluid and continued to do so during the day. One teaspoonful of whey was given every half hour up to ten o'clock and then every hour during the night. Nutrient enemata continued.

January 8th. Half a drachm of water was given every hour. The enemata were not well retained.

January 9th. Enemata omitted. Three teaspoonfuls of whey were given every hour and a teaspoonful of water every hour. The infant began to vomit again at 4 P.M., and vomited constantly during the night. Whey and water were omitted and the enemata resumed.

January 10th. Vomited very little. Became very weak and died about 11 P.M.

January 11th. Examination after death showed a healing incision one and three-quarter inches long above the umbilicus. No signs of inflammation. Adhesions of peritoneum with slight fibrino-purulent exudate on coils of small intestines and on edge of liver about the seat of the operation. Omentum adherent an-

teriorly. Pylorus very firm, admits probe two mm. in diameter easily. Coils of small intestines normally distended. The examination showed the cause of death to be a localized peritonitis behind the anastomosis. There had been apparently no leakage and curds had been passed in the movements.

The emaciation and weakness rendered the child a most unfit subject for operation, but in spite of this vomiting was immediately relieved by the operation, the consistency of the stools changed, curds appeared in the movements and the small and large intestines became normally distended. The outlook for recovery would have been excellent had it not been for the peritonitis which was obviously the cause of the recurrence of the vomiting and death.

The operation and subsequent course confirmed absolutely the diagnosis and would encourage one to undertake earlier operation on a similar case before weakness and emaciation became so pronounced.

The medical and surgical aspects of pyloric stenosis in infants have recently been so fully discussed in elaborate papers, especially that of Dr. C. L. Scudder, that it would but be repetition to bring them up again in reporting these cases.

It may however be said that while in the cases of complete pyloric stenosis there is seldom much difference in opinion as to the diagnosis and treatment, yet in the cases of incomplete stenosis, both congenital and acquired, judgments often differ. Certain general considerations should therefore always be carefully kept in mind as we ourselves have already met with a number of instances in which the surgeon was inclined to operate where a diagnosis of even partial stenosis was not justifiable.

We should recognize that a case of faulty feeding without any organic lesion may exactly simulate partial pyloric stenosis and also note that stenosis as a cause of vomiting is very infrequent in comparison with the innumerable cases of severe vomiting in no way dependent on organic disease, but on disturbance in digestion and metabolism.

We should also remember that while we cannot assume that pyloric thickening is absent because a mass cannot be felt, yet that in this class of cases the diagnosis should be arrived at only after a process of exclusion by careful experimentation with the food, following the general principles of modern scientific feeding.

Even then in the majority of cases often only presumptive evidence can be obtained, but it may be enough to justify exploratory laparotomy.

DISCUSSION OF THE PAPERS OF DR. GRIFFITH AND OF DRS. ROTCH AND LADD.

DR. MORSE.—I have had the opportunity of seeing 4 cases of this disease. One of them has been reported by Dr. Townsend. Another one came into the hospital this spring when it was four weeks old. It began to vomit when two weeks old while taking breast milk, and though it was weaned and the food repeatedly changed, the vomiting increased. On the day it entered the hospital it passed a breast pin about one inch long and one-eighth of an inch wide, which had been missing for two weeks, so that at that time it must have had a pylorus that would permit the passage of such an object. There was nothing characteristic about the vomiting, which occurred ten or twelve times a day. The bowels were constipated, and the movements looked like meconium. A satisfactory examination of the abdomen was impossible until a week later because of rigidity of the abdominal walls; the stomach was then palpable below the navel, and there was visible peristalsis. This observation was repeated later, and an operation was advised. The advice was rejected for several days, and the baby was not operated upon by Dr. Murphy until it was six weeks of age. An enlarged and thickened pylorus about the size of a large cherry, was found at the operation. The striking thing to me, however, was the appearance of the intestines rather than that of the stomach. The intestine was not larger than a lead pencil anywhere. A posterior gastroenterostomy was the only operation possible. This was done, but the baby died in ten hours as the result of its extremely bad condition at the time of operation. The specimen has not yet been properly examined by section, but is now in the course of preparation.

In another case which I saw, a male child, also breast-fed, gained weight in the first few weeks, but began to vomit in the fifth week. Change in the feeding made no difference. In this case the vomiting occurred only once or twice a day, and large amounts were vomited at a time. The bowels were constipated and the discharges of a yellow color. I saw it first when eight weeks old. The abdominal examination was negative. As the symptoms increased steadily, it was operated upon by Dr. Bottmley in a similar way to the other case a few days later. It died ten days later.

Another case was seen at the Children's Hospital last summer. When it came in the tumor connected with the pylorus was easily palpable and about the same size as in the first case. Change in the

feeding relieved all the symptoms of stenosis, although the tumor remained. The baby unfortunately developed intestinal indigestion and died of that without any recurrence of the symptoms of obstruction at the pylorus. I think this case might have recovered under medical treatment had the child's digestion been better.

DR. ABT.—I desire to refer to a case of pyloric stenosis which came under my observation. I believe it is a variety somewhat different from that which has been commonly described in the recent literature. During the winter we admitted a little patient about three months old. He was being fed at the breast, but was brought to the hospital because he was vomiting continuously and losing in weight. We admitted the mother with the child because we wanted to continue the breast feeding if possible, and thought that by improving the nutrition and environment of the mother we would improve the quality of the milk. In spite of the breast feeding the child continued to vomit almost continuously. We weaned the baby and discharged the mother from the hospital. Examination of the child showed that it was greatly emaciated, there was no abdominal tumor to be felt, the stomach was moderately dilated, which was proved by inflating it with air as well as by the usual percussion methods. The baby was fed on artificial food; low percentage fat and proteid mixtures were tried, the stomach was washed out, the child was fed by the tube, but the condition remained unchanged. Very frequently the peristaltic wave with a recoil was observed in the region of the stomach; the wasting was continuous, and after four weeks of treatment we concluded to call surgical consultation. The surgeon agreed to perform gastroenterostomy, which was done with great skill, requiring eight minutes. The child, however, did not recover from the effects of the operation and died in twenty-four hours. The autopsy showed that the lumen of the pylorus was constricted its entire length. On making a slight incision through the wall of the duodenum and attempting to pass a probe upward through the pylorus into the stomach, it was noticed that the probe passed with great difficulty and could be made to enter the stomach only by using a great amount of force. A section of the pylorus was removed and submitted for examination. Prof. Hektoen reported to us that the specimen showed that there was an overgrowth of connective tissue, and that the bowel was constricted in consequence. It should be said, too, that there was no enlargement in the region of the pylorus such as is commonly observed in the cases of hypertrophic stenosis. The case then was undoubtedly one of congenital atresia of the pylorus.

I believe that in considering these cases we should divide them into three classes: (a) Spasmodic constriction of the pylorus; (b) hypertrophic stenosis, and (c) congenital atresia.

DR. ROTCH.—I have nothing to add to what I have already said, except that it would seem that the symptom of gastric per-

istalsis has been somewhat exaggerated, as it is often not diagnostic in infants. In a certain class of infants, especially in the gastric dilatation which is found in rhachitis, this peristalsis may be noticed without pyloric stenosis being present, and again where pyloric stenosis is present peristalsis may be absent.

DR. HOLT.—It seems to me we are greatly in need of deciding upon what symptoms the diagnosis in this disease shall rest. Undoubtedly there are many reported cases that are not really the disease. The Germans lay great stress upon the peristaltic wave and it certainly is a valuable symptom, but personally I have not found it in all cases. There are some cases in which one who is familiar with the disease can have no doubt about the diagnosis after two or three days' observation. There are others in which, after weeks of observation, we must feel uncertain.

DR. GRIFFITH.—I do not think I can add anything which will make the matter of the diagnosis of the disease more clear. It seems to be necessarily very uncertain. I recall one case seen last spring in the Children's Hospital, where one of my colleagues was for weeks in doubt. The child began to improve promptly after a change of food which, by a mere accident, happened to suit it, for many changes in diet had previously been made. I recall also another case in a quite young infant, who certainly exhibited many of the cardinal symptoms of pyloric stenosis, including obstinate vomiting and marked peristaltic movements in the gastric area. This child recovered promptly after a wet nurse was employed.

Disturbance of the Heart in Scarlet Fever.—In 35 per cent. of 191 cases of scarlet fever, Schmaltz (*Münchener medicinische Woch.*, August 9, 1904) found some abnormality in the vascular system. The pulse rate is increased at the outset but has no bearing on the prognosis, since lesions of the heart may be present with a slow pulse. If, however, the pulse remains or becomes rapid after the temperature has returned to normal, there is usually some cardiac lesion. In these cases there is an apical systolic murmur with displacement of the apex outward, and the second pulmonary sound is accentuated. Arrhythmia is a common accompaniment. Of 23 cases complicated with scarlatinal synovitis, 10 showed heart affection; 70 other cases showed heart trouble without synovitis. Necropsies were made on 13 cases; in only 1 was there endocarditis. The heart disturbance in scarlatina thus resembles that of diphtheria in affecting the heart muscles rather than the valves. Careful examination daily, rest in bed and ice to the precordium are advised. Digitalis is useless.

A STUDY OF LEUKOCYTE COUNTS IN FIFTY CASES OF BRONCHOPNEUMONIA, LOBAR PNEU- MONIA AND EMPYEMA IN CHILDREN.*

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In children, as in adults, the term leukocytosis is applied to a more or less transient increase in the number of the white blood corpuscles. In certain malconditions of childhood there occurs also a constant and essential over-production of the leukocytes, as in the pseudoleukemia of v. Jaksch. Though various theories have been offered to explain the temporary increase in the white cells occurring in acute diseases such as pneumonia, in truth little is known as yet about the exact pathogenesis of leukocytosis. In a general way, however, we have learned from the studies of Ehrlich and Wasserman that chemotactic influences must play an important rôle in the causation of the process.

A view that has been favorably received and bears out the chemotactic theory is that of Goldscheider and Jakob. About ten years ago these experimenters demonstrated that the injection of bacterial toxins and certain albuminous extracts into the circulation of animals caused a preliminary decrease in the number of the leukocytes and then a secondary hypoleukocytosis. According to these observers the primary hypoleukocytosis is due to a repellant chemotaxis on the leukocytes which causes their temporary arrest in the capillaries. There is then exerted an attractive chemotaxis which causes the stimulation to over-production of the blood-making organs. That there is something peculiar to the nature of the agents or toxins causing the leukocytosis is shown by the fact that in some diseases (*e.g.*, typhoid fever and malaria), the toxins exert an ultimate negative chemotactic influence on the white cells, resulting in hypoleukocytosis.

When we recall that leukocytosis often goes hand in hand with inflammation, and that inflammation is conservative in

* Read by Dr. Koplik before the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 20, 1905.

nature, we can readily see that leukocytosis, while often a manifestation of disease, is really an important process which frequently subserves a useful purpose. That leukocytosis is conservative in nature is illustrated by the observations of internists and surgeons that virulent cases of pneumonia and severe cases of appendicitis respectively may frequently be distinguished by the absence of leukocytosis.

A selective as well as a quantitative influence is exerted on the leukocytes by different agents; thus in acute and chronic infections the chief increase is in the polymorphonuclear leukocytes; in trichinosis and asthma, in the eosinophiles; and in lymphatic leukemia, in the lymphocytes.

As the result of the process of digestion, as the result of hydrotherapy and the administration of certain drugs, and in pregnancy, there occur physiological leukocytoses. While a certain amount of work has been done on digestive leukocytosis, we are not aware that careful and systematic studies have been undertaken on the various physiological leukocytoses that may occur in either adults or children.

An increased number of leukocytes after the ingestion of food is present both in adults and children; it has frequently been observed that from one to two hours after eating the increase begins, reaching the maximum from three to four hours after the meal. Durando Durante has shown that digestive leukocytosis is fairly constant and well marked in young children. This observer found the maximum increase present in the second hour after a meal; the chief increase was in the polymorphonuclear cells. Within certain limits the leukocytosis increased in proportion to the quantity of nitrogenous food ingested. Though in intestinal affections in infants there occurred retardation in the time of the digestive leukocytosis, yet there was no decisive change in its degree. Of interest in connection with this subject is the observation of Luciani, who, in the thirty days' abstinence of the Italian faster Succi, found a marked leukopenia present during the last three weeks of the fast.

During early infancy the normal leukocyte count is different from that in after life. On the normal blood counts in infants and children careful and exhaustive work has been done by Dr. Anna Perlin, whose article on the subject is as elaborate as it is interesting and instructive. The subjects were from one day to sixteen years of age, well nourished, in good general condition, and

with no signs of organic disease; in all cases digestive leukocytosis was avoided and control counts were made. A resumé of some of the excellent work done by this authoress has been arranged in the following table.

Age	Number of Cases	Maximum Leukocyte Count	Minimum Count	Average Count
1 day.....	13	19,000	13,800	17,100
2 days.....	13	19,600	16,400	17,800
3 days.....	16	19,900	12,600	16,300
4 days.....	5	19,000	14,000	16,900
6 days.....	4	13,400	12,200	12,800
10 days.....	3	12,000	10,000	10,970
12 days.....	2	12,000	9,800	10,900
17 days.....	1	11,600	11,600	11,600
3d and 4th week.....	3	13,200	9,900	11,700
10th week to 18th month...	12	15,000	8,800	10,900
2d year to 4th year.....	16	13,400	8,200	10,000
5th year to 7th year.....	16	11,200	7,800	9,400
8th year to 16th year.....	11	9,280	7,000	8,500

Dr. Perlin quotes the results of other observers and finds that in the main her findings correspond with those in the literature. Though all authorities are agreed that the leukocyte count is normally very high during the first three days of life, yet her own results are somewhat lower than those of other writers. It will be seen from the above table that from the first week of life to the fourth year, the leukocyte count, though not high, is yet slightly higher than the normal count in adults.

Another feature of prominence in infant life concerning the leukocytes is the fact that physiological variations depending upon certain temporary influences are more marked than in adults. So also with pathologic variations in infants; leukocytosis, as well as temperature, diarrhea and other signs of departure from the normal, can in infants be produced by slight morbid influences, which in adults would fail to produce these signs.

It is well known that in connection with the study of the blood in pneumonia patients, leukocytosis is an important as well as an interesting feature; and especially interesting is the study of leukocytosis in the pulmonary affections of children. In an article on "The Leukocyte Count in the Diagnosis of Diseases of Children," Head gives the results obtained in 15 pneumonia cases by Stengel and White, and himself. In all of the 3 cases of bronchopneumonia and 12 cases of lobar pneumonia there was a pronounced leukocytosis. Head found that the count is lower in bronchopneumonia than in lobar pneumonia, and that in the latter

type of disease the leukocytosis appears to be more pronounced in proportion as the child is younger.

In "A Report of 8 Cases of Pneumonia in Infancy, Treated with Antipneumococcic Serum," J. L. Morse says that the blood examinations in his cases "were too few to be of any value and the results were, moreover, not uniform." Interesting were his findings in an adult case of pneumonia in which the leukocyte counts were more frequently made. A drop in the leukocytosis usually followed the injection of the serum, and on the whole there was a continued diminution in the leukocyte counts while the injections were kept up; omission of an injection would be followed by a slight raise in the count.

Reports of work like that of Head above mentioned are not numerous in the literature, and the few that we were able to find were based upon an insufficient number of cases to be of much value. Yet considerable work in this direction has been done in the hospitals; at Mount Sinai Hospital, for instance, Dr. Koplik has always emphasized the importance of leukocyte counts, and in pulmonary cases especially has always insisted upon careful and frequently repeated blood counts being made by the internes.

The observations in this paper are based upon the records of 50 cases of pulmonary diseases in children, which occurred in the service of Dr. Koplik and myself.

I. LEUKOCYTE COUNTS IN BRONCHOPNEUMONIA.

There were 19 cases ranging in age from ten months to five and one-half years (see Table I. at end of article). The highest leukocyte count taken during the height of the illness was 73,000; the lowest, 12,600; the average was 33,900. There were twelve recoveries and seven deaths. In the former all the counts during the first few days of the illness were high, while toward the end of the illness the counts were low except in 2 cases; of these, 1 was complicated by mastoiditis and the other by tonsillitis. All of the 7 fatal cases gave high counts early in the disease; shortly before death the counts in 4 of these cases were markedly diminished, while they remained high in 3 cases; of these latter 3, 1 had an extension of the process and 1 was complicated by pertussis.

On comparing the age of the patients with the degree of leukocytosis, it will be seen that in children under two years of

age the leukocytosis is comparatively low. Inspection of Table I. shows also that the leukocytosis was independent of the extent of pulmonary involvement. In 5 of the cases only a small portion of one lobe was involved, yet the counts were high; and in the cases of extensive involvement (diffuse bronchopneumonia) the counts were comparatively low. Furthermore, it will be seen from the table that in those cases in which the temperature was higher than 103° F., the blood counts were usually lower than 30,000; while in those cases in which the temperature was lower than 103° F., the counts were usually higher than 30,000. It would appear, therefore, that the degree of leukocytosis and height of temperature bear no direct correspondence.

II. LEUKOCYTE COUNTS IN LOBAR PNEUMONIA.

There were 24 cases studied, varying in age from two and one-half to nine years. The highest count, while the pneumonia was active, was 55,800; the lowest, excluding the post-typhoid case and that of pleurisy, was 20,200; the average count was 31,700. It is interesting to note that of the 2 cases in which there was no leukocytosis, 1 was preceded by typhoid fever and the other was accompanied by pleurisy. There were but 2 fatal cases, and in both a well marked leukocytosis was present during the height of the disease, while just before death a marked drop in the leukocyte count was noted; one of these patients was suffering with aspiration pneumonia following post-diphtheritic paralysis.

Though a well marked leukocytosis is present when only one lobe is consolidated, yet the counts are even higher if more than one lobe be involved. Thus, leaving out of consideration the case following typhoid fever, the 7 cases in which more than one lobe was consolidated all showed a very high leukocytosis (30,600 to 55,800, average 39,800).

In lobar pneumonia as well as in bronchopneumonia, the leukocytosis seems to bear no relationship to the temperature. There may be higher temperatures and comparatively low initial counts, or there may be low temperatures and high initial counts.

During the course of the disease an increasing leukocytosis is the rule, reaching the maximum just before the crisis and then dropping rapidly. The marked fall that takes place is illustrated by the following cases selected from our series:—

	After the onset.	After the crisis.	Drop.
Case 1.....	26,400	8,000	18,400
Case 3.....	47,200	17,000	30,200
Case 12.....	33,000	12,000	21,000
Case 14.....	50,000	12,000	38,000
Case 22.....	36,000	9,200	26,800

In lobar pneumonia of adults there is frequently observed a precritical drop in the leukocyte count, upon the value of which as a confirmatory sign of approaching resolution some authors lay considerable stress. In the lobar pneumonia of children our own observations show that this precritical drop is frequently entirely absent. Moreover, a considerable transient fall in the leukocyte count owing to other causes sometimes occurs long before the time of resolution, and on the other hand there occasionally occurs a continuance of the leukocytosis for some time after the crisis. We believe, therefore, that in children the sign referred to is too inconstant and unreliable to be of any great prognostic significance.

On the other hand we have found that the leukocyte count is of great diagnostic aid in cases of lobar pneumonia and pleurisy with effusion in which it is suspected that empyema will supervene. We can recall cases of lobar pneumonia in children in which complete resolution had occurred and the temperature and leukocyte count had dropped to normal, but in which there remained signs of a small amount of fluid at the base of the affected lung. Careful and frequently repeated counts were made in these cases, and a sharp rise in the leukocyte count before other signs and symptoms had appeared was regarded as sufficient indication to warrant an attempt to confirm our suspicions by exploratory puncture of the chest; and, indeed, we were not disappointed. In such cases, therefore, we regard the rise of the leukocyte count as at least strong presumptive evidence in favor of the supervention of empyema.

The claim of various writers that the leukocytosis in pneumonia is modified by the virulence of infection and the power of resistance of the patient and their assumption that these two conditions determine the white cell count and ultimately the prognosis of the disease, seems to us in the present state of our knowledge rather speculative; for as yet there is no precise method of measuring and reducing to a numerical scale the "virulence of infection" and "power of resistance." And in the animal world it has been shown that while ultimate leukocytosis may follow an inocu-

lation of a given strength, yet this leukocytosis does not increase proportionately with the strength of the inoculating material. As yet we have no bacteriological means of gauging with any degree of accuracy the grade or degree of bacterial infection in the human economy, nor have we any positive tests for gauging the resisting power of the patient. True, we have certain clinical data to guide us in determining whether a given case reacts mildly or vigorously; but these clinical phenomena—*e.g.*, heart's action, degree of fever, cerebral and other complications, number of lobes affected, etc.—are too indefinite in nature to be reducible to a mathematical problem that will enable us to estimate or predict a blood count. In the disease under consideration, moreover, we have an infection that may be due to one or more of a variety of bacteria. In one instance it is due to the pneumococcus of Fraenkel, in another to the bacillus of Friedlander, while the streptococcus, the staphylococcus aureus and albus, the bacillus pyocyaneus, the bacillus of influenza, and Eberth's bacillus can all produce pulmonary inflammations of varying types and intensities. The fact that different micro-organisms can cause different kinds of pneumonia seems to us an indication for careful examinations of the sputum in all cases of this disease in which there is expectoration, with a view of aiding in the differentiation of the kind of pneumonia and possibly determining by this means the severity of the particular case. When this aid to diagnosis becomes universally practicable it may then be that we shall be able to speak more intelligently about the virulency of infection.

III. LEUKOCYTE COUNTS IN EMPYEMA.

In all of the 7 cases there was marked leukocytosis at the onset. There were six recoveries and one death; the fatal case gave the highest blood count at the onset of the disease and the highest terminal count. In one of the cases that recovered the process was bilateral; yet the leukocytosis was no higher than in the unilateral cases.

CONCLUSIONS.

(1) A well-marked leukocytosis is present in the bronchopneumonia of children.

(2) Leukocytosis in bronchopneumonia is independent of the amount of lung involved.

(3) The degree of leukocytosis in bronchopneumonia stands in no relation to the height of the temperature.

(4) Though there are some exceptions, yet in bronchopneumonia the general rule is that failure of the leukocyte count to drop when the pulmonary signs disappear indicates either a complication or a fatal termination of the illness.

(5) A constant and considerable leukocytosis may regularly be expected in the lobar pneumonia of children. The degree of leukocytosis is about the same as in bronchopneumonia (bronchopneumonia: average leukocytosis in 19 cases, 33,900; lobar pneumonia: average leukocytosis in 24 cases, 31,700).

(6) The leukocytosis in lobar pneumonia differs from that in bronchopneumonia in that the white blood count is higher when the pulmonary involvement is greater. If in lobar pneumonia two or more lobes be involved, a relatively high blood count may be looked for.

(7) The leukocytosis in lobar pneumonia furnishes no clue as to the height of the temperature.

(8) An increasing leukocytosis is the general rule in the lobar pneumonia of children, reaching the maximum just before the crisis. While failure to drop before the crisis may indicate a complication, yet this may be of no special significance. The pre-critical drop in the lobar pneumonia of children is inconstant, of little or no prognostic value, and cannot be utilized as means of determining the time of crisis.

(9) There is a high leukocytosis at the onset of empyema in children.

(10) In general it may be said that the diagnostic value of the leukocytosis in the pulmonary affections of children is limited.

(11) In certain instances, however, the leukocyte count is of great diagnostic aid. When, for example, in lobar pneumonia, resolution and the drop in the leukocytosis have occurred, and there are present signs exciting suspicion that empyema will be a sequela, then blood counts should frequently be made at regular intervals. A sharp rise in the count, provided that other causes of leukocytosis can be excluded, is then strong presumptive evidence of a supervening empyema.

For aid in the preparation of the following tables, the writer is indebted to Dr. Leo Kessel, house physician at Mount Sinai Hospital.

TABLE I.
BRONCHOPNEUMONIA.

Case	Age	Weight	Site of Lesion	Rectal Temperature	Pulse	Respira- tions	Complications	Leukocyte Count	Result
2	2 years, 3 months	26 lbs., 4 oz.	R. U. and L. L. lobes	101°-103°	140-160	36-44	Otitis Media	27000-8600	Recovery
5	5 " 7 "	33 " 9 "	R. U. and L. L. lobes	101°-103°	140-110	68-92	Mastoiditis	12600-13000	"
3	4 " 7 "	35 " 4 "	L. L. R. M. and R. U. lobes	99°-104°	110-150	28-44	None	73000-10200	"
4	4 " 6 "	37 " 4 "	L. L. lobe	99°-103°	110-140	28-36	Acute Follicular Tonsillitis	63200-20800	"
5	4 " 6 "	39 " 4 "	R. U. and L. L. lobes	100°-104°	100-130	30-48	None	24200-12200	"
6	5 " 8 months	30 " 6 oz.	R. M. and R. U. lobes	99°-105.6°	80-140	28-50	"	16600-4000	"
7	7 " 8 months	33 " 5 "	R. U. and R. L. lobes	99°-104°	90-160	30-45	"	38000-12000	"
8	13 months	16 " 8 "	R. U. and L. L. lobes	99°-103°	96-150	34-50	"	23800-12000	"
9	10 "	12 " 8 "	R. U. and L. L. lobes	99°-103.4°	90-160	30-64	"	22200-14400	"
10	4 years	23 " 7 "	R. U. and L. L. lobes	100°-103°	108-144	30-70	"	57800-27200	Died
11	3 " 3 months	24 " 7 "	R. U., R. L. and L. L. lobes	103°-105°	120-160	36-70	Enteritis	20600-11000	"
12	5 " 2 "	31 " 9 "	R. U. and L. L. lobes	103°-105.6°	136-150	45-62	Peritonitis of Rib	20000-10000	"
13	4 " 7 "	28 " 4 "	R. U. lobe	102.4°-103°	150-154	46-60	Extension of Process	56000-32000	"
14	2 " 1 month	19 " 2 "	R. U. lobe	100°-103°	120-150	50-60	Pertussis	45000-50000	"
15	1 year, 1 "	21 " 2 "	R. U. and R. L. lobes	100°-103°	140-170	44-66	Empyema	36000-11200	"
16	1 " 2 months	21 " 1 "	R. U. and R. L. lobes	99°-101°	144-180	38-70	Enteritis	42000-9700	"
17	1 " 5 "	18 " 8 "	R. L. lobe	99°-101°	132-116	40-28	None	18800-11600	Recovery
18	2 years, 3 "	25 " 10 "	R. U. and R. L. lobes	99°-103.8°	140-114	38-28	"	29400-12600	"
19	19 months	22 " 4 "	L. L. lobe	102.8°-99°	140-104	44-28	"	23000-8600	"

TABLE II.
LOBAR PNEUMONIA.

Case	Age	Weight	Site of Lesion	Rectal Temperature	Pulse	Respira- tions	Complications	Leukocyte Count	Result
1	4 years, 3 months	36 lbs., 2 oz.	R. U. lobe	105.4°-99.8°	136-106	48-26	None	26400-8000	Recovery
2	8 "	53 " 6 "	R. L. lobe	102.6°-99°	120-96	36-26	Pleurisy with Effusion	29200-9000	"
3	6 "	44 " 9 "	R. U. lobe	104.4°-99°	150-90	70-30	None	47200-17000	"
4	6 "	43 " 4 "	R. L. and L. L. lobes	105°-99°	138-120	38-28	This case followed Typhoid Fever	9600-4800	"
5	5 "	36 " 5 "	R. U. and L. L. lobes	104°-100°	120-100	36-26	Empyema (operated)	30600-15000	"
6	5 "	36 " 11 "	R. L. lobe	102°-99°	128-104	54-24	Pleurisy, Tubercle Bacilli not found	8000-6800	"

TABLE II.—*Continued.*
LOBAR PNEUMONIA.

Case	Age	Weight	Site of Lesion	Rectal Temperature	Pulse	Respirations	Complications	Leukocyte Count	Result
7	5 years	37 lbs., 6 oz.	R. U. and R. L. lobes	101.0°-100°	124-100	40-34	Aspirat'n Pneum. following Post-diphtheritic Paralysis	41000-34400	Died
8	2 "	27 "	R. U. lobe	105.8°-95.2°	170-100	76-24	"	29800-13600	Recovery
9	4 "	33 "	L. L. lobe	100°-99°	116-96	32-24	"	25400-11600	"
10	6 "	33 "	R. U. lobe	103°-100°	130-104	32-24	"	31000-16800	"
11	7 "	44 "	L. L. lobe	106°-99°	176-114	46-34	"	35200-17600	"
12	6 "	39 "	R. U. and R. L. lobes	102°-99°	130-120	42-26	Empyema (operated)	33800-12000	"
13	3 "	35 "	R. U. lobe	104.4°-99°	118-90	36-26	Empyema (operated)	33800-10600	"
14	8 "	32 "	R. U. lobe	105°-99°	140-90	52-24	"	50000-12000	"
15	8 "	40 "	R. U. and L. L. lobes	105°-99°	160-116	56-32	"	45000-12400	"
16	2 "	22 "	R. L. and L. L. lobes	104.6°-99°	138-100	60-44	"	39000-13800	"
17	2 "	25 "	R. U. and R. M. lobes	105°-103°	160-150	50-42	"	55800-24600	Died
18	6 "	44 "	R. M. lobe	103.6°-98.8°	130-110	40-30	"	20000-10000	"
19	2 "	43 "	R. U. lobe	104.6°-99°	130-120	38-30	"	21600-11600	"
20	5 "	36 "	L. L. lobe	102°-99°	112-98	30-24	"	36400-12000	"
21	3 "	33 "	R. M. lobe	103°-99°	132-100	32-24	"	26400-8600	"
22	9 "	68 "	R. U. lobe	105°-99°	140-96	62-28	"	36000-2200	"
23	5½ "	31 "	R. L. lobe	105.8°-99°	128-76	58-28	"	27000-12400	"
24	9 "	.....	R. U. and R. M. lobes	105°-99°	130-100	40-28	"	34600-15000	"

TABLE III.
EMPYEMA.

Case	Age	Weight	Site of Lesion	Rectal Temperature	Pulse	Respirations	Complications	Leukocyte Count	Result
1	18 months	21 lbs., 9 oz.	Right side	104°-99°	128-108	36-32	None	25000-11200	Recovery
2	13 "	20 "	Left side	104°-99°	180-110	80-40	"	34200-10000	"
3	4 years	34 "	Right and left side	103°-99°	130-100	68-38	"	20400-13800	"
4	3 years, 8 months	34 "	Right side	104°-101°	140-126	38-32	"	33000-15800	"
5	2 "	30 "	Left side	104°-99°	120-108	36-26	"	24000-12800	"
6	2 "	23 "	Right side	104°-99°	140-108	38-26	Masses	22000-18000	"
7	5 "	59 "	Left side	105°-102°	152-130	44-40	None	33800-20600	Died

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Measles Without Eruption. — Rolleston reports (*The Lancet*, Dec. 10, 1904) the case of a girl aged five years, in which a diagnosis of measles was made, although there was no measles eruption. The diagnosis was based on the occurrence of several other cases in the same ward and the presence of cartarrhal symptoms, pyrexia, Koplik's spots, and the prodromal erythematous and urticarial eruptions. The case was at first taken for one of scarlet fever, and the correct diagnosis only made when Koplik's spots were observed. The child had had a previous attack of measles. Of all the acute exanthemata measles least frequently assumes anomalous forms. But the possibility of a non-eruptive measles under the name of morbilli sine morbillis or rubeola sine exanthemati has been admitted by the majority of writers.—*New York and Philadelphia Medical Journal*.

A FEEDING CHART FOR INFANTS AND ITS EDUCATIONAL ADVANTAGES.*

BY CHARLES DOUGLAS, M.D.,

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Feeding charts for infants are as necessary to keep a proper record of the amounts of foods and their effects upon the infants, as are the charts which we all use daily in hospital work in order to keep a correct record of both foods and medicine. Correct feeding of infants demands a minuteness of detail which cannot be carried by the memory from day to day. Especially is this the case where physicians are treating a number of these patients.

To the intelligent mother who is not educated on this subject, a good feeding chart is an immense assistance, and relieves her anxiety, as it concentrates her mind upon the essential foods and their effects upon the infant. This demands that these charts be filled by the mothers that they may learn what is needed. Mothers become immensely interested in this work, and are thereby educated above the many well meant but ignorant and untimely advices of their friends and neighbors. This protection is of unquestionable advantage to her as well as to her physician. Charts properly constructed and filled give an accumulation of knowledge from different sources and under varying conditions of infants.

The necessity for some written record to assist the memory was forced upon the writer by humiliating mistakes due to confusing the amounts of food given to different infants. Having once commenced making written records of foods, it was found necessary to enlarge them in order to secure complete details of foods given, methods of giving them, and of results also. This consumed considerable time at each visit, as changes were frequently made between visits, which were several days apart, and it was necessary to question the mother a great deal in order to

*Read before the Ohio State Pediatric Society, May 6, 1905.

obtain all the information regarding these changes. Very soon it was found absolutely essential for the mother to write out these details daily and thus avoid errors of memory and waste of time in obtaining this information.

From the time the mothers commenced doing this work, the different items on the chart were evolved rapidly, thus enabling them to see the results at different points, so that they could understand perfectly what is necessary at the present time to insure good health, growth and nutrition of their infants in the future. The intense interest shown by anxious mothers, and the industry with which they studied the effects of foods and changes in the amount thereof, soon proved the immense advantage this plan had when intelligently and regularly done.

As simplicity was necessary in every way possible, milk was treated in the ordinary household form by skinning the cream from the milk and then combining the cream or fat and the skim milk or proteids together again in proportions suited to the infant's digestive power, adding such amounts of sugar and starch as were needed for good nutrition. This is the simplest way possible in domestic work, and has given perfect satisfaction. The charts are all constructed and worked on this plan, and experience has recommended it strongly to the writer. This method of treating milk is familiar to every woman, requires no teaching, and is applicable to all qualities of milk and at all seasons of the year.

From charts thus filled by mothers, showing over thirteen thousand daily records of all foods used, exact amounts fed daily and their digestive results with their effects on the physical condition of the infants during their first twelve months, much detailed information is gained. As the same principles in digestion and nutrition apply during the second year, as well as all through life, the results shown by these charts are applicable in sickness and health at all ages, particularly in all sicknesses of a serious or prolonged kind where the nutrition of the patient is disturbed.

The majority of these charts are records of infants part of whose digestive glands had been imperfectly developed at birth or had been damaged by unsuitable or excessive amounts of fat, proteids or sugar, and were thus rendered unable to perfectly digest what are usually considered to be reasonable daily amounts of these foods in their dietary. In addition to these charts above cited, the deductions were the same from very many other daily

records which mothers found unnecessary to keep on a second child, as also from many others where mothers were too busy or disliked the trouble of doing it. These unwritten records number several thousand more from which these results are obtained.

The educational features which follow the regular daily filling of these charts are applicable to the physician in attendance and to the mother also.

To the physician, constant repetition of the same work with different patients and with the same patient at different ages and in varying conditions of health must bring a larger degree of knowledge, a more acute power of observation and analysis of results. In other words, when all the work is carefully, systematically and correctly prepared, as it must be when filling these charts properly, he will, with ordinary industry, become more expert daily in giving those directions for nutritional success.

The rule which is absolutely necessary in filling these charts is to make only one change in quality or amount of food at any time, and wait two days to see the effect of this change. This plan, when properly executed, shows the physician clearly what is the physiological effect of properly digested fat, proteids and sugar or starch; and when improperly done, that is, when fed too freely, the pathological results also. In this way the physician and the mother become experts in reading the effects of each food upon the comfort and growth of the infant, and also the digestive changes as pictured in the number, color, odor and consistence of the stools. This knowledge, obtained in this way from many cases, is of immense importance to the physician, and when properly utilized, enables him to analyze many acute as well as tedious complications affecting the skin, brain, spine, kidneys, lungs, heart or digestive tract in all forms of sickness, whether those disturbances are due primarily to a digestive error or only complicated by one.

The effect upon the mother of the knowledge thus obtained is most satisfactory, as she is thus protected against the adverse or disturbing effects so commonly produced by the advice and suggestions of her numerous female friends, and she thus becomes a most efficient assistant to the physician in this case and all others in her family.

These feeding charts, when filled as shown in the accompanying one, have demonstrated the following points:

FEEDING CHART.

Name, C. E. H.* Residence. Age, 17 weeks.

Date, 1904.	Sept. 27	Oct. 3	Oct. 9	Oct. 15	Oct. 21	Oct. 27
	oz. tea.	oz. tea.	oz. tea.	oz. tea.	oz. tea.	oz. tea.
Cream	3	3	3	3	3	3
Human milk	0	0	0	0	0	0
Skim-milk	19	19—3	20	20	20—3	20—3
Lime-water	3	3	3	3	3	3
Boiling water	22	22	22	22	22	22
Sugar { Cane						
{ Milk	1½	1½	1½	1½	1½	1½
Starch	3 tabsp.	5 tabsp.	5½	6	6½	6
Feed, how often	When Hungry					
Day meals { No.	2 4	4 2	3 2	3 2	3 2	3 2
{ Size	4 4½	4½ 5	4½ 5	4½ 5	4½ 5	4½ 5
Night meals { No.	2 1	3	4	4	4	4
{ Size ..	5½ 5	5½	5½	5½	5½	5½
Whole day's food	42	44½	45½	45½	45½	45½
Spits	No	No	No	No	No	No
Vomiting	No	No	No	No	No	No
Whole No. of meals ..	9	9	9	9	9	9
Whole No. of stools ..	1	3	2	1	2	4
Color	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Odor { Natural	Natural	Natural	Natural	Natural	Natural	Natural
{ Foul						
{ Splashy						
Kind { Soft						
{ Formed	Formed	Formed	Formed	Formed	Formed	Formed
Colic { Yes						
{ No	No	No	No	No	No	No
Weight	14—13	15	15—7½	15—15	16—7¼	16—9
Gas { Natural	Natural	Natural	Natural	Natural	Natural	Natural
{ More						
Gas { Up						
{ Down	Natural	Natural	Natural	Natural	Natural	Natural
Sleep { Day						
{ Night	Good	Good	Good	Good	Good	Good
Temper	Happy	Happy	Happy	Happy	Happy	Happy
Hungry before meals	5 min.	5 min.	5 min.	5 min.	5 min.	5 min.

Fats.—Few infants can digest more than five to six ounces of cream daily. The majority of them receive not more than two to four ounces for good development and perfect digestion. Nearly all of those infants who have been fed cream liberally with the idea of thus regulating the bowels, fail in this effort and the infant soon loses the power to digest this fat almost entirely, so that only skim milk can be fed with the small fraction of cream—about half of 1 per cent. which it contains. Where more cream is fed daily than can be digested, the infant loses its appetite, becomes gassy, has foul greasy stools, vomits its food, loses weight and becomes yellow colored. The use of one teaspoonful of cream

* This is an exact copy as filled by the mother of this infant on the above dates, and shows the progress made.

in the whole day's food frequently causes very decided gassy discharges in daytime with much disturbed sleep at night. The universality with which mothers frequently find it necessary to reduce this item or remove it entirely leaves no doubt about this difficulty. Certainly, more frequent disturbances are caused by cream than by sugar or skim milk in infants over a month old.

The new-born infant seems better able to digest the fat of cream during the first few weeks than many older ones, and if the fat digesting glands are not over stimulated by excessive amounts of this food, a fair amount, from three to five ounces daily, can always be used.

Skim milk contains all the proteids, $4\frac{1}{2}$ per cent. of sugar and $\frac{1}{2}$ to 1 per cent. of fat also; consequently it is the most valuable item in the infantile dietary. Very many of these charts when filled by the mothers show ciphers in the cream and sugar lines, but all of them carry a liberal proportion of skim milk. As it contains all the foods, this must necessarily be the case. Those infants who have been improperly fed usually have charts gradually changing to where they show the dietary composed entirely of skim milk and starches.

As with cream, excessive feeding of skim milk quickly causes foul, gassy, undigested stools frequently containing curds. A reduction of the skim milk within the digestive power of the proteid digesting glands removes the curds at once. Usually, a reduction of one or two ounces is enough. These curds are not affected by suspension of the proteids in starch as they appear in all forms of starch mixtures when proteids are fed too freely. The popular idea that the starch mixtures prevent curds in the stools is a fallacy in itself, but the addition of cereals or starches increases the strength of the food and thus reduces the amount of curd forming food which the infant requires each day.

Skim milk can be added in teaspoonful amounts to the cream mixture about the third week of a normal properly fed infant and increased often enough to reach twenty-two to twenty-five ounces daily in infants ten to twelve months old. These charts show that more than this amount generally causes indigestion and foul, green or curdy stools, demanding a reduction to secure comfort and growth. Healthy infants over two months old consume about one to one and one-quarter ounces daily of cream and milk for each pound they weigh.

Water is necessary to dilute the food, but seldom will an in-

fant thrive well on a too dilute mixture. The best results are obtained where infants consume from two to two and three-quarters ounces of food mixture daily for each pound they weigh. Larger proportions than these make uncomfortable babies and retard growth.

Milk-sugar must be about one-eighteenth to one-twentieth of the whole food mixture to secure good development. It may be either milk or cane-sugar or a combination of both. When of cane-sugar only about one-half this amount can be fed. This proportion is allowable only when starch is not part of the dietary, but must be steadily decreased as starch is increased until, in most of the charts with a liberal allowance of starch, no sugar is used. The indications demanding a reduction of sugar are always a redness around the rectum or increased gassy disturbances.

Pasteurization of milk foods gives the best results according to these charts; while many do well in cold weather on a good pure raw milk, all show that pasteurization in temperate and warm weather gives the only safe results. As many different milks were used by these mothers, living from one to two hundred miles apart, the general trend is to pasteurize at all seasons in order to have the progress even and free from gastric and bowel disturbances.

Starches should be commenced very early, probably during the second month, certainly not later than the third. One-half to one teaspoonful of rice, barley or wheat flour well boiled in the water used for diluting the milk is enough daily to commence with. This may be increased one teaspoonful every few days until the infant of eighteen to twenty pounds who cannot take milk liberally consumes thirty to thirty-five flat teaspoonsful daily or its equivalent in solid, starchy foods, crackers, bread crumbs, crusts, etc. Solid starches and boiled eggs usually show good results with these infants at eight or nine months.

As all sugars and starches are digested by the same glandular secretions, the charts show it impossible to increase the starch without lessening the sugar. The effort to do so always causes vomiting of food, extra gas or watery discharges from the bowels.

Feed how often.—Children with healthy stools should be fed as soon as they become hungry. Those with foul, watery or splashy stools are being unsuitably fed, and consequently, demand a fixed time between meals with necessary changes in food to produce healthy stools.

Meals.—Two sized meals should be fed during the daytime. By doing this, mothers realize whether they should increase or decrease the food. Meals should vary in size from one-half to one ounce and there should be at least two of these large meals each day.

Night Meals.—The night meals should always be one-half to one ounce larger than the largest day meal. Infants digest better and always sleep longer when the meals are larger at night. Children over six months old, who are fed during the night, are always peevish, irritable and either fail entirely or increase in weight slowly. Their nutrition is always poor.

Whole Day's Food.—An infant of two months or ten pounds in weight will consume twenty-five to thirty ounces of food daily. An infant of ten months or twenty pounds in weight will consume about forty-eight ounces daily. This leaves eighteen to twenty-three ounces of increase to make in eight months or an increase of about three ounces monthly, which would be less than one drachm daily increase in the bulk of the food for correct feeding. Irregular increases in food always give gastric and bowel disturbances and poor nutrition.

Spits.—The half or teaspoonful which infants frequently raise from the stomach with belching of gas indicates that the stomach is full, and this measures the proper volume of the infant's meals.

Vomiting.—This occurs immediately after meals when the amount of food is too great. Vomiting one-half to one hour after meals may be due to excessive amounts of water, sugar or cream. Children never thrive well who vomit artificial foods, but the nursing infant may vomit and still thrive well.

Whole Number of Meals.—Just as adults are uncomfortable and distressed when fed an irregular number of meals, so are infants likewise. The charts show that infants never thrive when the number of meals varies daily. Gradual lessening in the number of meals is necessary as the infants grow older. Where this is not done, children do not progress satisfactorily.

Number of Stools.—During the first month, when on a fatty diet, infants may have more than two stools daily and thrive well. After the first month, successful feeding calls for only one or two formed stools daily.

Odor.—The odor must be natural for success. Foul stools show decomposition of fat or proteids. This is caused by feeding more of these items than there is digestive fluid to properly

convert them. Success demands a reduction in the amount of them to that point where the odors are natural. Sour stools are caused by excessive sugar or starch and also demand a reduction in these items.

Kind of Stools.—The feeding of infants is only successful when the stools show some formation. They will be of the soft, fatty kind during the first month but should resemble those of the adult after the first month. The charts always show stationary or a decrease in weight when the stools become foul odored, soft or splashy.

Colic.—Infants with healthy stools have no colic. Foul odors and green mucus, soft or splashy stools always accompany colic. There is no such thing as a three months' colic when an infant is properly fed.

Weight.—These charts call for daily weighing, and in most cases this has been accomplished. All infants progress or increase irregularly from day to day. This is explained by a nearness to the last meal, urination or stool at the time of weighing. The average increase during the week is a true indication of the progress.

Gas, Natural or More.—Correct feeding always calls for eructations of gas immediately after the food is taken. The infant should not be laid down to sleep until after this gas has been raised as it cannot rest well unless this is observed. Continual belching of gas between meals shows fermentation of starches or decomposition of the animal foods. This also shows that the meal or parts of it are in excess of some digestive fluid secreted at that time. A reduction of this article is necessary for success.

Gas, Up or Down.—Extra raising or belching of gas points to quantity or gastric pressure and is usually not very distressing. Frequent gassy discharges from the bowels show overloading of the intestinal digestive power, and both call for a lesser amount of food. These infants always thrive better on less food.

Sleep.—The infant who has been fed the proper amount of each food sleeps well and thrives in proportion.

Temper.—The properly fed infant is good natured and happy. The improperly fed infant is always cross and irritable.

Hungry before Meals; how many Minutes.—An infant who is receiving those foods which it can properly digest must be fed within five or ten minutes of the time it becomes hungry in order to grow properly. When this infant is made to wait fifteen

minutes between meals, it will remain stationary or lose a little in weight. When compelled to wait twenty minutes between meals, it will lose from three to four ounces weekly, and if compelled to wait one-half hour, will lose from five to six ounces each week.

Temperature.—Many imperfectly nourished infants whose digestive organs have been seriously disturbed vary in temperature from $97\frac{1}{2}$ to 100° continually. The infant whose temperature has been raised suddenly from any acute illness must have the food reduced immediately to prevent digestive disturbances in addition to the illness from which it already suffers.

The Infants' Departments of Elementary Schools.—

Dr. Barlow, Medical Officer of Health for Bootle (*Pub. Health*, London, Vol. XVI., No. 10), discussing the subject of Infants' Departments in Public Elementary Schools, points out some of the dangers as to the spread of infectious and contagious diseases associated with them, and suggests that the *minimum* age for school attendance should be fixed at five years. In his district, for the last three years 40 per cent. of the scarlet fever cases treated in hospital were between the ages of three and five years, and about 50 per cent. between five and ten. At a moderate estimate, about 70 per cent. of the cases occurred among children who would attend the infants' departments of the schools. The advantage of beginning school life before the age of five is not apparent from an educational point of view, and Dr. Barlow considers:—(1) That children should not be permitted to attend school until they attain the age of five years; (2) that the hours of attendance (at present five and a half hours per day) in infants' departments should be shortened; (3) that hot and cold water should be provided, and any children coming unwashed should have the operation performed for them, and thus inculcate in them at an early age the elements of personal cleanliness; (4) that the rooms should be as airy and light as possible, with a large playroom attached, for use in wet weather; and (5) that in summer the instruction should be almost entirely in the open air, with a good deal of systematized play. If to these improvements there was added the provision of free meals to the poorest children, who are compelled to attend school, he believes there would be not only a reduction in the number of infectious cases, but also a marked improvement in the general health of the community.—*Edinburgh Medical Journal.*

THE INFECTION WITH SCARLET FEVER THROUGH OPEN WOUNDS.

BY CHARLES HERRMAN, M.D.,

New York.

The infection with scarlet fever through open wounds has always been a subject of interest to surgeons and pediatricians. As early as 1864, Maunder and Murchison, in England, called attention to the fact that patients with open wounds were more prone to contract scarlet. Later the subject was fully discussed by Riedinger, Henoch, Hoffa, Koch, De Boris and others. Recently articles have appeared by Leiner, who has called particular attention to scarlet following burns, and Rossiwall, who reported a series of cases from Escherich's clinic.

Undoubtedly, a number of the cases reported as so-called "surgical scarlet" would not bear a critical analysis. Many of them were, according to Hoffa, cases of simple erythema, due to vasomotor disturbances. These vasomotor or congestive erythemas are allied to the toxic forms, which are due to an absorption into the circulation of the secretion from the wound.

This latter form is to be distinguished from the septic and pyemic rashes. The genuine cases of scarlet fever must be separated into those in which the infection was simply coincidental, usually taking place before the injury, and the true inoculation cases in which the wound served as the portal of entry of the infectious material.

As to the frequency of this mode of infection Henoch says: "I have repeatedly confirmed the fact that patients with open wounds possess an increased predisposition to contract scarlet. Children with fresh wounds following operations (phimosis, tracheotomy), operations on the eye, etc., were often infected, the symptoms appearing in from four to seven days after the operation."

Heubner says: "In addition (to the ordinary mode of infection) the contagion of scarlet has the remarkable peculiarity that it finds entrance into the organism at any point at which there is a break in the continuity of the skin. A scratched varicella pustule,

a wound of the penis following an operation for phimosis, an accidental cut in the finger, may be the point of entrance of the infection. In such cases there is a change in the appearance of the wound, the edges become covered with a membranous exudate, the surrounding tissue becomes reddened, and starting from this point the rash spreads over the rest of the body."

Leube's case, in which he himself was the patient, is classical. The following is a free translation of his own description:

"I undoubtedly had a very slight predisposition to contract scarlet, for I was not infected either as a child when my brothers and sisters had the disease, or later when I treated cases. One day at an autopsy (the patient having succumbed to an unusually severe form of scarlet) I injured myself on the left index finger. Seven days later the wound, which had healed very slowly, began to pain. On the tenth day there was general malaise and angina; on the eleventh day vomiting and a marked rise of temperature; and later on the same day the rash appeared, beginning at the point of injury, following the lymphatics up the left arm in the form of a broad red band, and then spreading rapidly over the rest of the body."

"Although this was apparently a genuine case of inoculation scarlet fever, I do not support the view of a few authors that the average period of incubation is from twelve to fourteen days. Against this view there is the experience of the majority of clinicians who hold that the period of incubation is not longer but rather shorter than one week. In my opinion from the case recorded only this much may be concluded with a fair amount of probability, namely, that a person who is not receptive in the usual way, may be unable to withstand the direct infection by inoculation, and that even in such a case he may show his increased power of resistance by the fact the poison requires a longer time to gain sufficient potency to produce the symptoms of the disease. Possibly it is for this reason also that the contagious material of a severe case, even when directly inoculated, may cause a relatively mild attack in the person infected. I must support this view the more because others have observed a very short period of incubation (from one to four days) after infection through wounds." Leiner, after reporting 3 cases, concludes: "There seems to be a genuine connection between burns and scarlet infection, either because the burn offers a point of entrance for the virus, or because it increases the predisposition to scarlatinal infection."

In none of Leiner's cases, and in very few of the others reported, was the source of infection known.

On account of the unusual circumstances the following case is worth recording:

Beginning on June 26, 1905, J. A., five years old, had an attack of scarlet fever of moderate severity, with vomiting, fever, angina and rash. There were three other children in the family, but the conditions under which the family lived were so poor that all four children were constantly together. None of them had previously had an attack of scarlet fever.

On July 11, 1905, A. A., three years old, the sister of the first patient, contracted the disease in a very mild form, with vomiting, moderate fever, and a rash which was not at all pronounced.

On July 20, 1905, I saw these 2 patients for the first time. Both children showed desquamation on the hands and feet; and J. A. also on the body.

Two days previously, that is on July 18, 1905, in the morning, T. A., four years old, brother of the previous two patients above, walked against the stove (the weather being very warm the children went about with bare arms and legs) and received a severe burn about four inches long and one inch wide on the extensor surface of the right upper arm. No dressing or covering of any kind was applied to the wound!

On July 19th, in the evening, the boy began to vomit.

July 20th, A.M., vomiting repeated. Face slightly flushed. Temperature 100.5° F., per rectum.

July 21st, A.M., 101° F. The wound on the arm was covered with a dirty membranous exudate, the edges reddened. The right axillary lymph nodes enlarged and tender, scarlatinal rash on the right arm, chest and back. The throat slightly reddened, but no exudate. No marked enlargement of the submaxillary lymph nodes. The tongue coated, the papillæ prominent.

July 22d, A.M., 102° F. The rash has spread to the abdomen and legs, and is especially marked in the lower hypogastric and inguinal regions. The throat the same as before.

July 24th, A.M., 102° F. Tongue cleaning. The wound on the arm shows a remarkable improvement in appearance, the exudate has almost entirely disappeared. The axillary lymph nodes smaller and not painful.

July 26th, A.M., 102° F. Desquamation beginning on the arms, chest and back, also especially well marked in the lower

hypogastric and inguinal regions. The wound on the arm perfectly clean and healing rapidly. From this time the patient made an uninterrupted recovery.

No bacteriological examination of the secretion from the wound was made. The mere presence of streptococci in a wound of such a character would not justify the drawing of any conclusions as to their etiological significance.

In this case there can be no doubt as to the diagnosis of scarlet fever, and very little that the infection took place through the wound resulting from the burn. The important features are:—

(1) The patient was not infected until he received the burn, although he was continually exposed to the contagion for three weeks.

(2) One child, one and one-half years, was not infected at any time.

(3) The arm was entirely exposed, and the wound was not protected in any way.

(4) The short period of incubation, about thirty-six hours.

(5) The characteristic changes in the appearance of the wound following the infection, and the remarkable improvement after the rash had reached its height.

(6) The enlargement of the neighboring lymph nodes.

(7) The slight angina, the absence of exudate and enlargement of the submaxillary lymph nodes.

The absence of marked throat manifestations was all the more remarkable because the boy had chronic hypertrophied tonsils.

In scarlatinal infection through the usual channel the lesion of the buccal mucous membrane is, so to speak, the open wound.

In extra buccal infection changes take place in the wound which may be considered analogous to those which are ordinarily seen in the throat, namely redness, swelling, the formation of an exudate, and involvement of the neighboring lymph nodes.

The following case of possible extra buccal scarlatinal infection was presented some time ago at a meeting of the Harlem Medical Association, and is also interesting on account of the unusual complications.

The patient was not under observation from the beginning. Fortunately, however, the mother was a very intelligent woman, and kept a record of the case, so that the previous history may be considered fairly accurate.

A. H., eight and one-half years old. Hereditary negative.

Father died of injuries sustained in an accident. Mother has besides the patient, two older children, at present in an orphan asylum. No miscarriages. As a baby the patient had a bullous eruption. (Pemphigus?) At three years of age, measles. No hemorrhagic diathesis manifest.

On March 12, 1901, the patient was vaccinated on the left arm at a dispensary. Ten days later, that is, March 22d, the vaccination was pronounced successful. No covering was applied to the wound.

On March 25th, A.M., the child felt sick and did not eat any breakfast, nevertheless she went to school. In the afternoon she remained at home, headache, vomiting.

March 26th. The same symptoms.

March 27th. A rash appeared which was first noticed on the left arm and later spread over the entire body. The mother did not pay especial attention to the appearance of the vaccination wound.

The rash was distinctly visible for four days.

On April 3d the patient complained of pain in the knees.

April 4th, swelling of the knees.

April 5th, red spots appeared on both legs.

April 7th, severe abdominal pains, coming on in attacks, and lasting with intervals for twenty-four hours. In these attacks the patient vomited and cried out. The face was pale and anxious and covered with a profuse perspiration.

Following the attacks the stools were black. The patient was seen by a physician during this attack.

April 10th, the face swollen. During the next few days the swelling diminished and the spots on the legs disappeared.

On April 14th the child was taken out for a walk, the diagnosis of scarlet evidently not having been made. The following day:

April 15th. Fever, vomiting. The face again swollen.

April 16th. Pains in the knees, swelling and fresh spots on both legs.

April 17th. I saw the child for the first time. She was pale. The face and legs were edematous. There was distinct desquamation, especially on the hands and feet. On both legs there were a number of hemorrhagic spots, varying in size from a ten-cent piece to a half-dollar. About fifteen on each leg. There were no hemorrhagic spots on the mucous membrane. The knee joints

were still swollen and somewhat painful. The urine was pale, slightly turbid. Specific gravity, 1.016; microscopically a few red blood cells, leukocytes, hyaline and granular casts were found. Albumin. Three pro mille. Esbach. The heart and lungs except for a slight bronchitis were negative. No fever. The vaccination wound entirely healed.

The patient was put to bed, the diet regulated and warm baths ordered.

April 18th. Less pain in the legs.

April 19th. The hemorrhagic spots disappearing, leaving pigmented areas. The legs and face still edematous. During the next few days the patient improved.

April 25th. A fresh attack of pain and swelling of the knee joints. Fresh spots on both legs, this time petechial in character. During the next few days the symptoms gradually disappeared, and from that time the patient made an uninterrupted recovery. During the summer she went to the country and returned vastly improved. On examination on December 10th, showed no albumin in the urine. The patient has had no recurrence of symptoms and attends school regularly.

In this case there can be no doubt as to the diagnosis of scarlet fever. Besides the presence of the cardiac symptoms, the desquamation and complicating nephritis make the diagnosis certain. The source of contagion could not be definitely determined. The onset of the disease while there was an open vaccination wound, may have been merely a coincidence, but remembering the usual short period of incubation in infection through open wounds, it may very well have taken place on the tenth to the twelfth day after vaccination when the wound was open and uncovered.

Cases of so-called Henoch's purpura (of which the above is undoubtedly an example), following scarlet fever, are extremely rare. Simple purpura complicating scarlet fever is not so very uncommon.

In the above case the possibility of a hemorrhagic diathesis manifesting itself after vaccination (Pfeiffer, Epstein) must be remembered. However, in such cases the hemorrhages appear from four to eleven days after vaccination. In the case reported twenty-four days intervened.

As far as I know, no one has called special attention to the possibility of scarlatinal infection through open vaccination wounds. Although it probably requires unusually favorable con-

ditions for the infection to take place in this way, it would seem advisable to cover all such wounds by a protective dressing.

A number of cases of scarlet fever following vaccination have been observed, but it has always been assumed that the occurrence was simply coincidental. In all probability a few of these, as well as some of the post-vaccinal scarlatiniform eruptions were genuine cases of inoculation scarlet.

Usually attention is called to the absence of marked throat symptoms. As we have seen, this is rather a point in favor of the diagnosis of scarlet by extrabuccal infection. As to the period of incubation in scarlet, it seems to depend on—

(1) The virulence of the contagious material. This varies in different individuals and in different epidemics. Other things being equal, the greater the virulence the shorter the incubation period.

(2) The receptivity of the individual to that particular virus, or in other words his power of resistance to that particular infection. The greater this power the longer the time required for the toxic substance to develop sufficient strength to call forth the characteristic symptoms of the disease.

(3) The point of entrance of the infectious material. The more direct the route, the more rapidly the virus enters the circulation, the shorter the period of incubation.

An individual who is relatively immune to infection through the usual canals (oral or nasal cavity), may contract the disease by direct inoculation through a wound, possibly because of the more rapid absorption of the poisonous material which does not give sufficient time for the production of antitoxic material to combat the attack.

SUMMARY.

(1) Cases of scarlatinal infection through open wounds have the following characteristics:—(a) The period of incubation is short. (b) There is a characteristic change in the appearance of the wound following infection. (c) The neighboring lymph nodes become enlarged. (d) The rash usually (but not necessarily) begins at the point of inoculation. (e) The throat symptoms are mild. There is no exudate or marked involvement of the sub-maxillary glands. (f) After the rash has reached its height, the wound improves rapidly in appearance. (g) Desquamation usually (but not necessarily) begins around the wound.

(2) Extrabuccal infection with scarlet fever is probably more frequent than is generally supposed. It should be looked for in cases in which (a) The period of incubation is unusually short. (b) The throat symptoms slight. (c) The rash makes its first appearance in an unusual location.

(3) All children exposed to scarlatinal infection should have open wounds (including vaccination) covered by a protective dressing.

(4) The period of incubation in scarlet fever depends on (a) The virulence of the contagious material. (b) The receptivity of the individual. (c) The portal of entry of the infectious material.

(5) An individual who is immune to infection in the ordinary way, may contract the disease by direct inoculation.

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Epistaxis and Diphtheria.—Ernest Vieillard has collected a series of observations, in which he points out the importance of coryza and epistaxis in diphtheria (*Jour. de Méd. et de Chir. Pratiques*, December 10, 1903). Epistaxis in diphtheria does not always depend upon the separation of false membranes. It appears sometimes at the beginning of, and even before, the symptoms of coryza, and thus belongs to the prodromal period. Appearing thus early, it is a grave symptom, even should the amount be small. In some cases, on the other hand, there may be a considerable amount of hemorrhage. The writer refers to a case of nasal diphtheria quoted by Sanné which ended fatally at an early date. In all cases of diphtheria hemophilic patients run a great risk of severe hemorrhage. The earlier the appearance of epistaxis the worse the prognosis, and in cases of intensely malignant angina, epistaxis is an initial symptom. Thus, in 25 cases of epistaxis occurring before the appearance of coryza, death occurred in 20 (80 per cent.). In all cases in which epistaxis appeared at a later date—that is to say, consecutive to diphtherial coryza—the mortality was 70 per cent. In a series of 6 cases of early epistaxis collected by Geyott (*Thèse de Paris*, No. 445) 5 terminated fatally. Such hemorrhages, he says, are of considerable importance from the point of view of prognosis, as they are an indication of the severity of the infection. It is in these cases that sudden death from cardiac toxemia occurs. Vieillard states that occasionally the discharge from the nose may be an oozing the color of licorice juice. Examination of the nasal mucosa shows that it is covered by bloody mucus and dark-colored false membrane, or even blood clot. He regards all cases in which such discharge occurs as particularly malignant.—*British Medical Journal*.

INFANT MORTALITY IN MICHIGAN AND DETROIT, WITH AN INQUIRY CONCERNING A NORMAL INFANT MORTALITY.*

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Infant mortality is a not inaccurate measure of the civilization and good government of a country. It has been recently shown to have a definite relation to the rise and spread of democracy among the common people. The highest infant mortality of the present in countries whose statistics are available occurs in Russia, Bavaria, Austria, and Italy, while Norway, England, Canada and the United States show much better conditions. This is not difficult to understand when one remembers that the women of the first mentioned countries labor in the fields and may often be met hitched in front of a wagon with a donkey or a dog, or carrying brick and mortar up long ladders in the cities. Successful maternity and child-raising demand certain favorable conditions for the pregnant woman, and that she may have proper time to give her child proper care after birth. As the working classes increase in intelligence and are surrounded by better conditions of living, we find them exempting their women from these unnatural conditions, and the story of their advancement is fairly well told to the discerning reader by the decrease in their infant mortality.

The parallel does not fail to hold good in better governed states. An English writer has recently said that the birth and care of a child is the greatest object of civilization, and that personal and national morality and success in the future are to be measured by that standard. "One may imagine all our statesmen, philanthropists and public men, our parties and our institutions gathered into one great hall, and into this hall a huge spout which no one can stop, discharges every eight seconds a baby. Our success or failure with that never-ending stream of babies is the measure of our civilization." It is evident that the statistics of infant mortality are of interest not only to the medical profession, but also to all students of social and political conditions.

* Read before the Michigan State Medical Society, June 29, 1905.

In Michigan there is a curious discrepancy between the infant mortality in the state at large and the city of Detroit. In 1900 the death rate for all ages per 1,000 inhabitants in the state was 13.4 and in the city 14.14. The death rate of infants under one year of age was in the state 121.3 and for the city 201.2. This shows that while the city compares very favorably with the state in general mortality, it furnishes far more than its share of the deaths of infants. We may even go further and say that Detroit not only exceeds the state at large greatly in its infant mortality, but that it also exceeds with one exception every city in the country equally large, omitting New Orleans and Baltimore, which can hardly be compared justly with Detroit in this respect because of their large negro populations and great difference in climate. This relation to the other large cities is shown by the following table compiled from the last United States census. (See p. 4.)

CITIES.

	Infant mortality—1900.
1. New York	189.4
2. Chicago	146.6
3. Philadelphia	201.9
4. St. Louis	164.4
5. Boston	194.1
6. Buffalo	150.9
7. San Francisco	152.2
8. Cleveland	185.5
9. Cincinnati	174.3
10. Pittsburgh	180.5
11. Detroit	201.2
(Baltimore and New Orleans omitted.)	

STATES.

Michigan	121.3
Vermont	122.1
New York	159.8
Massachusetts	177.8

CITIES.

Grand Rapids	146.1
Bay City	112.9
Kalamazoo	135.9

Battle Creek	89.4
Jackson	101.2
Ann Arbor	103.0
Milwaukee	190.2
Toledo	157.2
St. Paul	96.9
	1890. 1900.
United States	205.8 165.4

In this table are first arranged the large cities of the country in the order of their size, with the infant mortality per 1,000 of those living of the same age. Further down are a few of the states whose figures are available, showing that the state of Michigan has the smallest infant mortality of any of the registration states. Finally, I have added the rates of a few nearby cities that we may see what our neighbors are doing.

That the country as a whole is making progress along these lines is shown by the fact that the death rate of infants decreased in the registration areas of the United States from 205.8 in 1890 to 165.4 in 1900, while between the ages of one and two, the rate fell from 84.9 in 1890 to 46.6 in 1900, by far the largest decrease for any of the periods recorded. In New York City in 1891 there were 18,224 deaths under five years of age, with a population of this age of 188,703, a rate of 96.0. In 1896 the rate was 77.5 and in 1900 it was 67, the population then being 233,537 and the deaths 15,648. Thus, although the infant population had increased by over 44,000, the total number of infant deaths actually decreased by 2,000. This was not accomplished accidentally or without great and well directed effort. Many agencies contributed to this magnificent result. Holt attributes it to a "wider diffusion of knowledge in the matter of infant feeding and hygiene; the fact that a larger number of infants than ever before are now sent into the country in summer; that all infants are looked after with greater care in the summer, many agencies being at work to improve their condition. Not least important of these is the improvement of the milk supply and the furnishing of pure milk gratis from different centres, together with the general adoption during hot weather of some form of milk sterilization—a practice now well nigh universal among the tenements. Anti-toxin has reduced the number of deaths in older children."

In the city of Detroit, however, the rate of infant mortality has shown no consistent decrease as is shown by the following table of deaths for the last six years.

Year.	Deaths under one year.	No. deaths per 1000 of same age living.	
1898	1,091	167.7	} Including Still-born.
1899	1,137	174.1	
1900	1,149	175.6	
1901	1,093	166.6	
1902	1,205	182.3	
1903	1,187	178.9	
1904	1,043	156.5	

In 1900 the total number of deaths registered (excluding 106 deaths returned subsequently from November registration townships) in the State of Michigan, was 33,778, of which 9,443 (28 per cent.) were under five years of age and 6,866 (20 per cent.) were under one year. In Detroit the whole number of deaths was 4,934, of which 1,610 (32 per cent.) were under five and 1,149 (23 per cent.) were under one. This means that the children of the state under one year of age, less than one-fortieth of our population, furnished over one-fifth of the total deaths in the state and nearly one-fourth of the total deaths in the city.

Inquiring a little closer into this high mortality, we find that the monthly distribution of infant deaths in the city of Detroit for the three years, 1898-1900, was as follows:—

Month.	Deaths under one.	Cholera infantum, infant diarrhea.
January	71	3
February	88	1
March	76	3
April	73	0
May	72	1
June	114	9
July	173	81
August	138	32
September	95	22
October	76	34
November	87	4
December	61	0

Of 6,866 deaths under one year in the state in 1900, 1,933 or over one-fourth were due to infantile diarrhea. Many deaths recorded as due to convulsions or debility were undoubtedly also due to diarrheal disease, so that the share of infantile diarrhea in the total death rate is even greater than the figures here given would indicate. This being the largest single item of death, it has also been given by months, as near as may be, the figures for cholera infantum being given for 1900. (This shows the great correspondence of the infant death rate to the single item of infant diarrhea.)

During the last four years over 40 per cent. of the total deaths in the city of Detroit in July and August were from children under five years of age. It is not possible to say just what proportion of these deaths were due to diarrheal diseases, but from the figures already given, it can hardly be doubted that this is the principal etiologic factor. In the state, the total number of deaths in the months of July, August and September, 1900, was 8,587, of which 1,778 or 20 per cent. were caused by infant diarrhea.

There is no other single disease which forms so large a part of our mortality for any given season as infant diarrhea. It also ranks among the first three diseases in the point of total mortality in the state. In fact, in 1900, it was the cause of more than any other one disease, the exact figures for that year being as follows:—

Infant diarrhea	2,503
Organic heart disease	2,472
Pneumonia	2,035
Tuberculosis of lungs	2,018
Cancer	1,460

In other years, either tuberculosis or pneumonia commonly heads the list, but they with organic heart disease occur at all seasons of the year more or less uniformly and at all ages, whereas infant diarrhea, as shown in these figures, comes from one year of life and largely from one season of the year.

The mortality under one year of age in the city of Detroit for the year 1900 then, was about fifteen times as great as the general mortality at all ages for the city. The infant death rate in both the city and the state of Michigan has been ten times as great as the general mortality rate as far back as we have any

reliable statistics. This excessively high rate has been regarded with complacency in general. Comment on the subject is apt to be met by both the profession and the laity with the remark that a large number of deaths among the new-born is to be expected. The reasons given may be included in the conditions recorded ordinarily among the causes of death as congenital debility, hereditary disease, and malformations. In the table following which probably represents a fair average, malformations, congenital debility and premature birth, caused 1,596 deaths in a total number of deaths under one year of 6,866 or 23.2 per cent. The comment above mentioned is, then, true in a limited degree. The causes mentioned do bring about a large number of deaths during the first year of life, while they are largely eliminated from later death reports. Statistics of the causes of death, however, quickly show one that these causes do not at all account for the prevailing high rate of infant mortality; on the contrary, the rate is at once seen to be unnecessarily high because of the large proportion of the deaths of infants which occur from preventable diseases.

In recognition of these facts the author has attempted to formulate as nearly as may be a normal infant mortality. In order to do this, deaths should be included in such a mortality only from those diseases which are still considered by the profession to be non-preventable. This is, to subtract from recent mortality statistics those deaths occurring in children from preventable disease, and to call the remainder a normal, an unpreventable, mortality.

In order to determine which diseases should be considered preventable, the following question was addressed to a number of well-known physicians representing different parts of the country and mostly prominent in pediatrics. "Will you kindly mark on the enclosed sheet those diseases of children which you regard as preventable by sanitary regulations and efficient medical attendance, leaving those unmarked which you regard as still unpreventable?" The enclosed sheet contained the list of diseases of the condensed Bertillon System of international classification of diseases for statistical purposes. Replies were received from the following physicians: Dr. L. Emmet Holt, New York; Dr. J. P. Crozer-Griffith, of Philadelphia; Dr. F. Forchheimer, of Cincinnati; Dr. C. G. Jennings, of Detroit; Dr. Geo. Dock, of Ann Arbor; Dr. H. B. Baker, of Lansing, and Dr. John Lovett Morse, of Boston. The substance of their replies is shown in the following table:

LIST OF DISEASES.	Holt.	Dock.	Jennings.	Baker.	Forchheimer.	Crozer-Griffith.	Morse.	NUMBER OF DEATHS IN MICHIGAN IN 1900.		
								Under one year.	One to two years.	Under five years.
1 Typhoid fever.....	I	I	I	I	I	I	I	5	13	39
2 Measles.....	I	I	I	I	I	I	X	87	69	229
3 Scarlet fever.....	I	I	I	I	I	I	X	21	27	151
4 Whooping cough.....	I	I	I	I	I	I	X	135	37	199
5 Diphtheria.....	I	I	I	I	I	I	X	49	256	274
6 Influenza.....	I	I	I	I	I	I	X	36	7	52
7 Other epidemic diseases.....	I	O	I	I	O	I	I	8	3	13
8 Malaria.....	I	I	I	I	I	I	I	7	4	23
9 Tuberculosis.....	I	I	I	I	I	I	I	76	40	168
10 Rheumatism.....	X				I			2		4
11 Diabetes.....								1		5
12 Other general diseases.....							I	88	10	111
13 Simple meningitis.....							I	133	71	287
14 Cerebrospinal meningitis.....							Xem			
15 Cerebral congestion.....						X	X	54	12	77
16 Paralysis.....								7	2	13
17 Convulsions of infants.....	X		1		X	X	X	458	43	519
18 Other nervous diseases.....								93	28	139
19 Organic heart disease.....	X						O	153	10	169
20 Other circulatory diseases.....	X						O	13	7	26
21 Bronchitis.....	X				I	X	O	292	77	412
22 Pneumonia.....	X			I	I	X	O	547	208	916
23 Pleurisy.....	X				X	X	O	5	1	10
24 Other respiratory diseases.....	X							103	17	134
25 Stomach diseases.....	X							203	23	239
26 Infantile diarrhea.....	X		I	I	I	I	X	1,933	404	2,502
27 Dysentery.....		I	I		I	I	X	60	25	107
28 Liver diseases.....								21	4	32
29 Peritonitis.....						X	O	16	10	35
30 Ilac abscess.....								1	2	10
31 Other digestive diseases.....							X	106	19	144
32 Bright's disease.....						X	I	5	1	8
33 Other genitourinary diseases.....						X	I	29	10	50
34 Skin diseases.....					X	X	X	54	9	70
35 Locomotor disease.....							X	17	5	23
36 Malformations.....								183	17	204
37 Diseases of infancy:								1,413	21	1,441
(a) Congenital debility.....										
(b) Premature birth.....						O	O			
(c) Neglect.....	I	I	I	I	I	I	I			
38 Accidents.....					I	I		113	46	234
Total.....								6,866	1,366	9,443
Preventable.....								3,078	751	4,605
Per cent. Preventable.....								44.8%	54.9%	48.7%

Key { I Preventable.
X Largely preventable.
O Partially preventable.

On the whole there is fairly good agreement in the answers; a few have qualified the word preventable by "almost entirely," "largely" or "partly" in the case of a few diseases. Curiously enough, the only disease which was absolutely and unqualifiedly agreed to be preventable was typhoid fever, and in May this disease was present in 117 different places in the state of Michigan. Small-pox was not directly checked in this list, as it is included under the head of "other epidemic diseases."

Following the consensus of opinion, typhoid fever, measles, scarlet fever, diphtheria and croup, whooping-cough, influenza, other epidemic diseases, malaria and tuberculosis would be regarded as preventable. Convulsions of infants are regarded as

largely preventable, and there is substantial agreement that stomach diseases, infant diarrhea and dysentery are preventable. These diseases then, and they only, will be considered preventable for the purposes of this paper. It will be noticed that only three of the single diseases (exclusive of congenital anomalies) failed to be held by at least one correspondent "largely preventable." These three are diabetes, cerebrospinal meningitis and iliac abscess. Four of the gentlemen quoted consider bronchitis, pleurisy and pneumonia to be at least "largely preventable." It is of interest also, to note the long list of diseases to which Dr. Holt applied this term. Dr. Griffith and Dr. Forchheimer insist that accidents should be considered preventable, and indeed when one compares the number of accidental deaths in any American city with that in any English, French or German city of the same size, and considers the customs of these cities, it is difficult to escape the conclusion that many of our accidental deaths are due to poor police regulations and enforcement.

On this same chart is shown the number of deaths in the state of Michigan for the year of 1900, from each of the causes on the list for the ages named. Of 6,866 deaths under one year of age, 3,078 or 44.8 per cent. were caused by the preventable diseases. Of 1,306 deaths, between the ages of one and two, 751 or 54.9 per cent. were preventable. The mortality for Michigan for 1900 having been 126.8 per cent. (under one year), if 44.8 per cent. of this was unnecessary, the normal number of deaths for that year would have given a rate of seventy deaths per 1,000 of living infants. If this saving of life could have been carried out in Detroit last year, it would have had the lowest general mortality of any large city in the country.

It may be said that this rate of seventy per 1,000 of living infants is still too high to be called a normal infant mortality; certainly nothing higher could be termed a reasonable one. In the calculation only that part of the present high mortality has been taken away which is generally conceded to be preventable. As a matter of fact, infant mortality among the better classes of Americans can to-day be kept at about one-half the figures quoted above. Dr. Holt in his presidential address before the American Pediatric Society in 1898 said: "Of 151 children who have been in my care during practically their whole infancy, during the last eight years, not one died before reaching the age of two years, only thirty of this number being entirely breast-fed, and in the last

eight years' practicing almost exclusively among children, I have had among my own patients but six deaths under two years." Dr. Holt continues that he has personally inquired of six of his colleagues in pediatrics in New York and finds that their mortality in private practice varied but little from his own; and he concludes, "From the facts thus obtained, I judge that in the well-to-do classes, with the best care, the mortality from all causes during infancy does not exceed 2 to 3 per cent. These are hopeful signs and show the possibility of very great reduction in infant mortality everywhere with a better understanding of all the conditions but especially of infant feeding."

CONCLUSIONS.

(1) Infant mortality and the care of children are in a general way a measure of the civilization and enlightenment of a state or community.

(2) The state of Michigan and the city of Detroit while corresponding very closely in their general mortality rates, differ markedly in the relative rates of their infant mortality.

(3) The state of Michigan presents the lowest infant mortality rate of any state in the registration area of this country.

(4) The infant death rate in Detroit exceeds that of any other city in the north equally large with the single exception of Philadelphia.

(5) There is general misapprehension of the real cause of this excessive mortality.

(6) The chief item in this high infant mortality is diarrheal disease.

(7) Infant diarrhea is constantly one of the three largest causes of death in the state. Being confined to one year of life and largely to one season of the year, it constitutes the most concentrated body of mortality which we have, and in that respect affords a good mark toward which we may direct sanitary measures.

(8) Since infant diarrhea and the contagious diseases are largely preventable, this mortality is unnecessarily high.

(9) Contrary to the conditions in the country at large and in many of our large cities, infant mortality in Detroit is not decreasing.

(10) Our present sanitary laws do not efficiently protect our infant population from the diarrheal diseases.

(11) There was substantial agreement among the correspondents named that the following diseases of infants were preventable: typhoid fever, measles, whooping-cough, scarlet fever, diphtheria and croup, influenza, other epidemic diseases, malaria and tuberculosis, stomach diseases, infant diarrhea and dysentery.

(12) (a) 44.89 per cent. of the deaths under one year in the state of Michigan, in the year 1900, were from preventable diseases. This means that there were 3,078 unnecessary deaths in this age.

(b) Fifty-four per cent. of the deaths in the second year of life were from preventable diseases.

(c) Congenital conditions accounted for less than one-fourth the deaths under one year.

(13) On this basis a reasonable infant mortality for the state of Michigan, should not exceed 70 per 1,000 living infants.

(14) A normal infant mortality as shown by the experience of Dr. Holt and his colleagues in New York City, would be between 20 and 30 per 1,000 living infants, about one-tenth of the present rate of infant mortality of Detroit.

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Enuresis in Children.—Rey says (*Berliner klinische Wochenschrift*, August 29, 1904) a great many cases of enuresis in children are due to catarrh of the bladder, also to infection of the bladder with the colon bacillus which is often found in pure culture and which can be cured with salol and a suitable diet. Stress is laid upon an excess of ammonia salts in the urine, which can also be cured by salol and diet. Some cases of enuresis depend on phosphaturia, on increased uric acid excretion, or upon an accumulation of smegma bacilli about the corona. Occasionally, the oxyuris is the agent at fault. Treatment is mainly dietetic and is to be directed toward the correction of the vesical lesion. Suggestion by means of electricity is also of therapeutic value.—*New York and Philadelphia Medical Journal.*

THE STARVATION DIET.

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As summer draws to a close and the babies begin to return to the city the pediatricist sees a pitiful set of cases almost as peculiar to this season of the year as are the summer diarrheas to the heated term or the pneumonias to the winter months; these patients I think may be justly termed "the starvation diet cases."

The history in nearly all instances is very similar; at some time during the summer the child has had an acute attack of diarrhea, just what variety it is usually impossible to learn from the mother's statement, the baby generally being a bottle-fed child on either a proprietary food or a high per cent. cream mixture. The country doctor called to treat the child has evidently been trying to keep up to date by reading the medical journals and has gotten it firmly fixed in his head that diarrhea in any form is the signal for stopping all milk and giving a cereal gruel of some sort, he has not been contented with doing this for a few days but has continued it week after week or has added a little whey to the gruel or possibly a small amount of top milk. He tells the mother that "Baby cannot digest milk and will die if put on it." The child grows weaker and thinner and more anemic until the mother, becoming much alarmed, determines to return to the city and consult a "specialist."

The general appearance of all these little patients is also much alike; the thin, pale child with depressed fontanel, sunken eyes and flesh hanging in folds, showing all too plainly the great loss in weight, keeps up a pretty constant fretful wail, drops off into short naps only to wake in a few moments, has restless nights and is generally a most miserable little specimen of humanity.

Now, the mistake made by these well-meaning men lies not in the fact that they have placed the child on a gruel and omitted milk (for no treatment could be better for a few days), but in

their inability to judge of the proper length of time that this treatment should be continued, in their keeping it up so long that the baby loses ground which it may take him weeks and even months to regain.

Unfortunately no exact period for the purely cereal diet can be set, as this depends on the individual child and on the variety of intestinal disorder present, but in the average case of so-called "summer complaint" after the intestines have had a thorough clearing out by means of castor-oil or calomel and milk has been omitted for twenty-four or forty-eight hours, the temperature at the end of this time will drop and the stools begin to show some improvement, this is the time to gradually add a little milk to the cereal, and *not* top milk or cream which will so frequently provoke a relapse, but whole milk with the proteids predigested if necessary by means of a peptonizing agent. Only one half or at the most one ounce of milk should at first be added to each pint of the cereal, then the amount increased as rapidly as possible until the child is taking a formula suited to his age and the peptonizing discontinued if this process has been used. It is a well-known fact that fats cannot be borne in warm weather as well as in cold, so why expect the baby convalescent from an attack of summer diarrhea to take cream (often used as a laxative), when he may be given whole milk with the curd predigested for a short time if necessary?

The following are two of the many post-diarrheal starvation cases seen during the past few years, serving to illustrate what has been said above.

M. R., aged eleven months, never nursed, but fed on a "cream mixture" up to nine months of age, when patient had an attack of summer diarrhea with frequent thin, green stools and a temperature varying from 101° to 103° F. for two days, treated by a general practitioner who gave castor-oil, then barley-water, which he continued for nearly two weeks; at this time he added a small quantity of whey, gradually increasing the amount in proportion to the barley, until at the time when I first saw the child she was taking about two-thirds whey to one-third barley. The patient was steadily and rapidly losing weight; *very* constipated, with marked anemia, sleepless nights and fretful days. The family physician absolutely refusing to change the food, the parents decided to consult a specialist. The little patient when first seen was taking her bottle in a ravenous manner, screaming for more

as soon as it was emptied, then keeping up a pretty constant wail until next meal time. The scales possessed by this family were unreliable, so the weights taken were valueless. The patient was put on a formula consisting of fat 1 per cent., sugar 5 per cent., and proteids 1 per cent., the milk being peptonized one hour, then added to dextrinized oatmeal gruel made from the Health Food flour, 7 ozs. q. 3 h. This was continued for two days, then the formula increased to a 1.50-6-1.50. After three days more a 2-6-2 was given, peptonized for half an hour. The child's stools were now perfectly normal; she slept all night, but at times seemed hungry during the day; after three days more the interval of meals was lengthened to four hours, amount 8 ounces, peptonized fifteen minutes, and between two of these meals beef-juice given, beginning with half an ounce and working up to one and a half ounces, between two of the other meals farina cooked very thoroughly in milk. At the end of another week the child's improvement was most marked; she was gaining rapidly in weight, although no exact data could be kept; stools were normal; anemia much less marked. The formula was now increased to a 2.80-8.10-2.45, and the peptonizing discontinued; half a coddled egg was given in place of the beef juice twice a week. There were no set backs and the child steadily improved, until, at the age of thirteen months she was taking plain, undiluted milk and other food suited to a child of her age.

Baby H., aged eight months, first seen the third week in August, when the mother had returned to the city from the country, as she "wanted Baby to die at home." The child had previously been fed on one of the prepared foods, and since his fourth month on a top milk mixture, the milk being taken from the tops of two bottles of milk. This was continued until early in July, when he became ill with what his mother called "cholera infantum." At this time he was a plump, well-nourished child, but had vomited some ever since hot weather began. A local doctor in the country village was called. He gave the baby castor-oil and put him on albumin-water, which he continued for a week; he then ordered farina gruel made with water only. The movements improved, but the child grew steadily thinner and weaker; so after another week he tried barley gruel with a little cream taken from the tops of two bottles; the baby's temperature went up, the stools became thin, green and had some mucus. Castor-oil was again given, and granum, made as thick as the child could

possibly draw it through the nipple, used for food. This was continued until the third week in August, when all hope of saving the baby was abandoned.

When I first saw the child he was the picture of this class of cases. The emaciation was marked, weight being 12 pounds, great prostration, fontanel sunken, also the eyes, all mucous membranes were very pale; there was a constant hungry wail, except when the child dropped into a short nap, only to awaken in a few minutes; the stool seen was a typical granum movement, fairly thick, yellow, rather frothy and with a little mucus.

Treatment given was:—Liquid peptonoids 1 drachm, q. 3 h. in 1 ounce water between meals; and for food a .50-5-.50 completely peptonized added to granum made one even teaspoonful to the pint of water; 6 ounces of this q. 3 h. Three days later the baby had gained 8 ounces in weight; the stool seen was smooth and yellow, no mucus; he was much stronger and brighter; slept well at night, but cried when bottle was taken away in the day-time. 1.50-6-1.50 peptonized was ordered. When seen three days later the child had gained 7 ounces more, was bright and playful, fontanel normal condition, stool normal; a 2-6-2 was ordered and one meal each day of mutton broth 3 ounces, and barley-water 3 ounces. When next seen, four days later, the patient had gained 5 ounces more, color markedly improved, stool normal, took long nap in day-time as well as sleeping all night. This time the food was not strengthened, but quantity increased to 6½ ounces, and peptonized one hour only. At each succeeding call the food was gradually strengthened and time of peptonizing decreased until, at the end of four weeks after treatment was begun, the patient was taking 8 ounces of unpeptonized milk, two-thirds and granum one-third, every three and one-half hours. He was gaining at the rate of 6 to 8 ounces a week, and in a normal condition in all respects. During this time he had cut two lower central incisors with no trouble. I feel confident that if this child had been given a high percentage of cream mixture, one attack of diarrhea would have succeeded another, or if he had been kept on a cereal only, death would have soon resulted from starvation; but when a mixture was given containing a low percentage of fat and predigested proteids he was perfectly able to assimilate the food and make a rapid recovery.

7 West 92d Street.

Clinical Memorandum.

THE RELATIONSHIP OF GOITRE (PARENCHYMATOUS) TO RHEUMATISM IN CHILDREN.

BY J. R. CLEMENS, M.D.,
St. Louis, Mo.

In a series of 13 consecutive cases of parenchymatous goitre, where the children were brought to me for treatment of some acute condition, my attention was arrested by the fact that the acute disease to be treated in each case was rheumatism.

The ages of these children varied from eight to twelve years—twelve were girls. The time when the goitres were first noticed by the parents would correspond to the period of life between the sixth and the tenth year. In every case there was in addition to the rheumatic manifestations, upon which a diagnosis was made at the time, a strong past history of rheumatism antedating the earliest recognition of the goitre by the parents.

In 3 cases advanced chronic endocarditis was found. In the majority of the cases a family history of rheumatism was obtained.

If we turn to the literature, there is a striking similarity in the localities that favor the prevalence of goitre and rheumatism respectively. "In mountainous districts the disease (goitre) occurs entirely amongst the inhabitants of valleys where the air is moist and stagnant; the inhabitants of valleys, especially those that run north and south, into which the sun does not penetrate readily or for many hours in the day, which are always in the shade of neighboring and overhanging mountains, are especially prone to it. This is well known in the case of Switzerland, where the disease is endemic. So also in large towns, it occurs chiefly amongst the poor who live in cellars and kitchens or in damp, ill-ventilated streets and courts." (*Erichsen's Surgery*, Vol. II., page 614.) Dock says the disease is very prevalent about the eastern end of Lake Ontario and in Michigan. That Osler does not accept the drinking water hypothesis as origin of the disease is evidenced clearly by his statement that "no satisfactory explanation has been given of the existence of the disease in this form

(parenchymatous goitre)." (*Principles and Practice of Medicine*, page 750.)

In view of the interrelationship that exists between parenchymatous and exophthalmic goitre and of the possible connection of both with myxedema, it is interesting to remember the acknowledged causal relationship that rheumatism bears to exophthalmic goitre:—

"Quinsy, rheumatism and a tendency to bleeding, especially in the form of epistaxis, have been observed as antecedents in a significant number of cases." (*System of Medicine*. Allbutt. Vol. IV., page 489.) And again: "The association of the disease with other nervous disorders in the patient or in other members of the same family has often been pointed out. Chorea is one of the diseases with which it thus appears to have relations." (*Ibid*, page 490.)

Whilst 13 cases are too small a number to draw conclusions from, the 13 *consecutive* cases I have reported in this paper warrant me, I think, in rejecting the suggestion of mere coincidence where acute rheumatism was found associated with parenchymatous goitre—especially when on cross-examination a past history of rheumatism in the child (and often of one or both parents) was obtained in every case. The possible objection to the conclusion drawn, based on the fact that approaching puberty sometimes determines a hypertrophy of the thyroid gland, fails for the reason that although the children when brought to my notice were of an age when changes in their reproductive organs might be expected, yet the goitre was in each case first noticed at a period of life when no such causal relationship could be entertained.

A Case of Encephalitis Cerebelli.—F. Taylor (*The Lancet*, Nov. 19, 1904) refers to the case of a boy of four years, seen nearly thirty years ago. At the time the diagnosis was supposed to lie between disseminated infantile sclerosis and a cerebellar tumor, but the more recent development of the entity we call encephalitis cerebelli has convinced him that his earlier case belonged in this category. The patient had tremors and ataxia of the cerebellar type, nystagmus, absence of optic neuritis, a possible origin of symptoms in pertussis and recovery after a duration of three and a half years of symptoms. At the present time he is alive and well at the age of thirty-three years, without any trace of his early trouble. His muscular power, patella reflexes and optic disks are all normal, and he is able to indulge in athletic exercises.—*Medical Record*.

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RECENT ADVANCES IN THE TREATMENT OF BRACHIAL BIRTH PALSY.

Until very recent years the treatment of brachial birth palsy was entirely expectant and palliative. This system of treatment has been favored largely by the optimistic tone of most of the text-books as to prognosis, the impression being conveyed that the great majority of the cases undergo spontaneous recovery in the course of a few months.

Judging by the considerable number of persistent cases which

appear annually at the orthopedic and neurologic clinics either the total number of cases produced is much greater than is usually supposed or the prognosis commonly given is too favorable. In either case the fact remains that a large number of individuals are handicapped through life by the deformity and disability resulting from lesions to the brachial plexus during birth. These patients get but slight benefit from the various forms of palliative treatment.

The aim of the practitioner must be twofold: first, and most important, the prevention of the lesion; second, a rational system of treatment, based upon the pathology of the lesion, for such cases as have unfortunately occurred. Prevention of the lesion must be based upon a clear understanding of its etiology. The one causative factor in all cases of permanent palsy is a tearing of the nerve root or roots due to overstretching, and this overstretching results only from the diastasis of the shoulder and neck on the side of the injury. To be a little more concrete, in vertex cases, when the shoulder is caught at the pelvic brim, or under the symphysis, only moderate traction upon the head and neck should be used. Where forceps are used, oscillation should be minimized.

In breech cases the lesion is caused by the fingers hooked over the shoulders at the base of the neck, which not only pull both shoulders down away from the head and neck, but also cause some lateral pressure upon the already tense nerves and thus favor their rupture. The obvious thing to do in breech cases is to put as much of the necessary traction as possible upon the legs and the minimal amount upon the shoulders, for any amount of traction on the legs does not seriously stretch the nerve roots. The lesion itself consists in a greater or less tearing of the cervical nerve roots of the brachial plexus with interstitial hemorrhage, and later resultant cicatricial changes.

In the mildest cases the pathologic changes are slight and

spontaneous recovery occurs within a few months. Massage, electricity, etc., hasten this recovery.

In other cases, where the damage results in cicatricial formations, a permanent lesion persists in spite of treatment. In accordance with the number and distribution of damaged nerve fibres the paralysis varies between the affection of a few muscles and involvement of the entire extremity. This latter condition signifies an avulsion of the entire brachial plexus.

It is evident, from the nature of the lesion that while palliative treatment can accomplish certain beneficial results (maintain muscular nutrition, prevent contracture deformities, etc.), it can never restore motor power to muscles whose innervation is blocked by cicatricial barriers in their nerve roots. Evidently the rational thing to do is to remove the cicatricial tissue surgically and unite the severed nerve ends. This suggestion was given to the profession by Kennedy, of Glasgow, in February, 1903 (*British Medical Journal*), some of whose cases show brilliant results. Since that time much systematic work on the subject (which is to be published) has been done in this country with such results as to favor the surgical treatment of every case of permanent damage to the plexus.

The best time at which to operate is still a matter for discussion, but, for practical guidance up to the present time, children about a year old are the most desirable subjects. At that age the permanent part of the lesion is well defined, the operative field is larger, and the resistance to shock is greater than at an earlier period.

During this waiting period systematic palliative treatment must be used to prevent deformity and maintain nutrition in the damaged extremity. After the nerves have firmly united, following operation, the same means must be employed until nerve power has returned sufficiently to permit the child to exercise the extremity naturally.

In all cases where paralysis remains at the end of the year after

birth (or even less), there is certainly cicatricial tissue interfering with nerve function and the removal of the cicatrix is a prime necessity.

ALFRED S. TAYLOR.

THE SIXTEENTH INTERNATIONAL MEDICAL CONGRESS.

The next International Medical Congress will be held in Lisbon, April 19th to 26th, 1906. It is expected that it will be one of unusual importance, for a meeting which will be held in what has always been considered as an out-of-the-way country. Already the title of papers from some of the most distinguished men of the medical profession have been received. Dr. Ramon Guiteras, secretary of the American National Committee, furnishes a preliminary notice of the following topics, from among those selected by the executive committee, which are of special interest to pediatricists:—

I. *Section of Descriptive and Comparative Anatomy, Anthropology, Embryology and Histology.*

Definition, structure and composition of protoplasm.

Cellular changes in normal tissues.

Evolution and involution of the thymus gland.

II. *Section of Physiology.*

The role of leukocytes in nutrition.

The thyroid secretion.

Renal permeability.

The nutritive value of alcohol.

The physiology of the cytotoxins.

The blood ferments.

III. *Section of General Pathology, Bacteriology and Pathological Anatomy.*

Preventive inoculations against bacterial diseases.

Preventive inoculations against protozoic diseases.

Preventive inoculations against diseases from an unknown specific agent.

IV. *Therapeutics and Pharmacology.*

Local therapeutics in infectious diseases.

The therapeutic value of bactericidal serums.

The relation between the molecular constitution of organic bodies and their physiological and therapeutic action.

V. *Section of Medicine.*

The pathogenesis of diabetes.

The pathogenesis of arterial hypertension.

The treatment of cirrhosis of the liver.

Cerebrospinal meningitis.

International defense against tuberculosis.

Meningeal hemorrhages.

VI. *Section of Medicine and Surgery of the Urinary Organs.*

Surgical intervention in Bright's disease.

Progress of urology in the diagnosis of renal disease.

VII. *Section of Pediatrics.*

Spastic affections of infancy; classification and pathogenesis.

Cerebrospinal meningitis; etiology and treatment.

The social struggle against rickets.

Orthopedic surgery in affections of nervous origin, spastic and paralytic.

Congenital dislocation of the hip.

The treatment of abdominal tuberculosis (peritoneal).

Bibliography.

Infantile Mortality and Infants' Milk Depots. By G. F. McCleary, M.D., D.P.H., Medical Officer of Health of the Metropolitan Borough of Battersea. Pp. xiv-135. Illustrated. London: P. S. King & Son, 1905. Price, 6 shillings, net.

The first chapter of this volume deals with the decline of the English birth rate. After showing by statistics how great has been the loss in the fertility of the race the author states that it is important to neutralize this loss, as far as possible, by a substantial reduction in mortality. To this consideration he ascribes much of the growing interest in the prevention of infantile mortality. Humanitarianism and preventive medicine are more and more intolerant of the ravages of preventable diseases.

The third and fourth chapters relate to infant feeding and many of the sentences suggest a close reading of Chapin, whose conclusions are freely quoted. Statistics from Brighton (England) are interesting by comparison with opinions recently expressed in this country. Newsholme found that the percentage of deaths in infants from diarrhea was more than double in those fed on cow's milk alone than in those fed on cow's milk and farinaceous food.

The balance of the book deals with milk depots both in England and on the continent of Europe. The details entered into with the contractors who furnish milk to the Battersea depot read in many particulars like the circular of the Milk Commission of the Medical Society of the County of New York.

A book of this character shows the importance of the subject of infant feeding and also gives evidence of the missionary work done in America which is being fully acknowledged and accepted in England.

The illustrations are half-tone reproductions of photographs of milk stations, dairies, etc., and are well printed.

Current Literature.

PATHOLOGY.

Scott, S. G. and Telling, W. H. M.: A Case of Infantile Splenic Anemia. (*The Lancet*, June 17, 1905, p. 1,638.)

A boy, eight months old, had an enlarged spleen and slight jaundice. At the time of death the spleen reached nearly to the crest of the ilium and to the middle line. On autopsy the spleen weighed 13 ounces, was filled with red cells, and the Malpighian corpuscles were indistinct. The bone marrow showed an active production of red cells. The lymph nodes resembled red bone marrow both in gross appearance and cellular content. The blood showed a lymphocytosis and a very marked lowering of the red blood cells.

Reuling, Robert: A Case of Right-sided Infantile Hemiplegia, with a Description of the Pathologic Changes in the Spinal Cord. (*Johns Hopkins Hospital Bulletin*, January, 1905, p. 21.)

A woman, aged twenty-eight years, died in the University of Maryland hospital of sepsis, following an abortion. Her family history was not obtainable. When she was two years old she had convulsions, followed by rightsided paralysis. She had one child at full term. She had had epileptic convulsions from childhood and while in the hospital had two severe attacks.

Autopsy. Right extremities much wasted. Abdomen showed severe peritonitis. Brain. The left hemisphere was much smaller than the right. The whole brain and skull cavity were under size. The fossæ of the left side were much smaller than those of the right, except in the case of the posterior fossæ, where the reverse was true. The dura on the left side was thick and opaque. In the region of the first, second and third frontal convolutions the dura was markedly retracted, forming a cavity over the third frontal gyrus. In the first frontal region two cysts were opened and found to contain a strawcolored liquid, and in the second frontal gyrus another cyst was found.

The entire left hemisphere and left medulla showed atrophy. This condition was true also of the right cerebellum and the right half of the cord below the decussation of the pyramids as far as

the social region. The article is illustrated with cuts of the gross and microscopic specimen.

Spiller, Wm. G.: General and Localized Hypatonia of the Muscles in Childhood. Report of a Case with Necropsy. (*University of Pennsylvania Medical Bulletin*, January, 1905, p. 342.)

The author briefly reviews the work of Oppenheim and reports the following case:—

A male child, twenty-two months old, was admitted to the University Hospital, July 15, 1904. The family history was negative. The child was born normally at full term. At five months it was noticed that he was very apathetic and weak. The anterior fontanel closed at five months. The first tooth appeared at one year and at date of admission he had ten. He was always constipated and had difficulty in swallowing when weaned. The eyes had a convergent squint.

On examination the muscles were found to be flabby but of fair bulk. The tendon reflexes were absent and the skin reflexes diminished. The legs could be placed in contact with the trunk without discomfort. The child could not sit nor stand alone. Occasionally it seemed to notice a watch held before its eyes. While in the hospital it had to be fed by gavage. It died with a temperature of 104° F. on August 4th.

Autopsy showed a slightly fatty liver and a normal brain and cord. The muscles seemed to be in a state of hyaloïd degeneration with much fatty connective tissue. The author considers the disease purely muscular and congenital and thinks that cases may show improvement.

Marfan, A. B.: Chronic Congenital Stridulous Breathing, Hypertrophy of the Thymus, and Hereditary Syphilis. (*Annales de Méd. et Chir. Inf.*, February 1, 1905, p. 1.)

The pathology of the thymus is still obscure and subject to controversy, hence observations calculated to throw the slightest light upon the subject should be reported.

The case here quoted appears to merit attention.

An infant, fifteen months old, suffered with intense dyspnea upon admission to the hospital. Intubation and finally tracheotomy failed to relieve the dyspnea. Antidiphtheritic serum was

injected. Examination failed to reveal exudate in the pharynx. Scattered râles, coarse and fine, were heard all over the lungs.

For five days previous to admission the child had suffered from dyspnea; he had a somewhat hoarse cough, the voice was clear. The high temperature together with the auscultatory signs caused the physician to make a diagnosis of bronchopneumonia, complicating a laryngeal stenosis, probably of diphtheritic origin. Absence of relief as a result of intubation was attributed to bronchopneumonia. Bacteriologic examination of the pharyngeal mucus proved to be negative for diphtheria bacilli. Subsequently the fever abated, dyspnea continued and respiration was somewhat noisy. Later symptoms of suffocation occurred and the cannula was replaced. Swallowing was difficult and attempts to take milk were accompanied by coughing—at times there was regurgitation.

A week after admission the temperature rose and medium and fine mucous râles were heard over the right base—dyspnea continued.

The cannula was replaced by a long tube, this was eventually removed and the tracheal wound was permitted to heal. The respiratory symptoms returned. Aggravation of the symptoms followed crying or emotion of any kind. Stridor was more marked when the child was in a horizontal position.

Adenoids were not found and palpation revealed no malformation to account for the stridor.

Questioning elicited the information that noisy breathing had existed since birth. The family history was negative. The child was not rachitical and there was no thoracic deformity. The abdominal organs were normal and the urine was negative for albumin. Nutrition was poor, the child not being larger than an infant of seven or eight months.

The patient remained in the hospital about one month; a bullous eruption accompanied by an elevation of temperature occurred during convalescence, but was of brief duration.

Enlargement of the tracheobronchial lymph nodes was thought to be the cause of the symptoms.

Two months later the child was again brought to the hospital. He was cyanosed and respiration was scarcely perceptible. He died on the way to the operating room. An autopsy revealed hypertrophy of the thymus and a syphilitic spleen. No malformation, no lesion of the larynx and no enlargement of the

tracheobronchial lymph nodes were found. The thymus measured $11 \times 4\frac{1}{2} \times 2$ cm., and weighed twenty-two grams; the body weight was about fourteen pounds. The heart showed a pervious ductus arteriosus. All the other organs were normal. The writer does not doubt that the chronic congenital dyspnea was due to an hypertrophied thymus which caused compression of the trachea.

Hereditary syphilis is regarded as having been the cause of enlargement of the thymus. Hyperplasia of the spleen, perisplenitis and persistence of the ductus arteriosus are enumerated as being diagnostic of specific disease.

MEDICINE.

Branson, Guy J.: Cerebral Symptoms in Measles. (*British Medical Journal*, April 29, 1905.)

A girl, aged twelve, was first seen February 25th, the third day of the rash. Previous history good. Three elder children had very severe attacks of measles and an elder brother nearly died of tubercular meningitis. The patient's temperature had never been above 102.5° F. She had severe gastric disturbances. On February 26th, while sitting up in bed, she fell back in convulsions. These lasted half a minute and unconsciousness followed. The author saw her half an hour later. She was irritable and restless, though still unconscious. The pupils were somewhat sluggish to light. This condition persisted until the afternoon of February 27th, when she began to sleep for short periods. February 28th she was better and able to swallow liquids. Beginning March 1st the rash faded quickly and she showed signs of consciousness. From this time on recovery was rapid, the only further symptoms being a lapse of memory from February 26th to March 1st and a slight increase in excitability with accompanying muscular twitchings.

Rhein, J. H. W.: Encephalitis and Other Nervous Affections Complicating Scarlatina. (*American Medicine*, June 17, 1905, p. 991.)

A girl of nine was ill with scarlet fever following measles. She had nephritis and a general muscular tremor. On autopsy the pia was found to be thickened; the blood vessels of the brain

were congested, and minute hemorrhages were present. The author infers that an inflammatory meningitis or encephalitis may occur as a result of the irritation caused by the streptococcus or its toxins. He reviews the literature and draws the following conclusions:—

“The most common complications of scarlatina on the part of the nervous system are hemiplegia and peripheral neuritis. More rarely, optic neuritis, amaurosis, tetany, pseudoataxia, neuralgia, epilepsy, sclerosis, Friedreich’s ataxia, hysteria, chorea, hydrocephalus and meningitis. With the exception of hemiplegia and imbecility the prognosis is good. The pathologic findings consist of thrombosis, embolism, small cerebral hemorrhages, rarely abscess of the brain, congestion of the brain, meningitis, and finally combined meningitis and encephalitis.”

Schlesinger, Eugen: The Connection Between Erythema Nodosum and Erythema Exudativum Multiforme—the Two Affections Compared. (*Jahr. für Kinderh.*, Vol. 40, 1905, p. 256.)

From among the large group of polymorphous erythemata called erythema multiforme, a form of the disease showing characteristic lesions stands out; these lesions are nodes on the anterior and inner aspect of the lower extremities, together with well characterized general symptoms and a typical cyclical course, in consequence of which the affection is classed with the exanthematic infectious diseases, more especially of childhood, for it is in childhood that the purest and most characteristic form occurs. The clinical picture of this disease and its infectious character have frequently been described in detail, but its relation to the idiopathic and symptomatic form of erythema multiforme, as well as its connection with rheumatic affections, purpura, etc., is still undetermined. It is the object of this article to contribute to the better understanding of this phase of the subject as well as to elucidate, if possible, the nature and pathogenesis of the disease.

To this end a series of personal observations were made. Idiopathic erythema nodosum, idiopathic erythema exudativum multiforme and the symptomatic forms of these erythemata are dealt with separately, a discussion of their relationship forming the conclusion.

Under the first head the onset, which is characterized by gastro-intestinal symptoms, is described. In their severer form

these symptoms may suggest typhoid or meningitis. An angina lacunar, in a case otherwise simulating typhoid, caused the writer to rule out the diagnosis of beginning typhoid in one case.

Secondly, the eruptive stage is noted. This is accompanied by an irregular remittent fever and fall by lysis in the second week. Fever is rarely absent. The chief symptom in all but the mildest cases is a great degree of prostration with marked mental depression. Articular pain is not characteristic of erythema nodosum in children. Enlargement of the spleen, strange to say, rarely occurs. Convalescence begins with the commencement of the third week. In exceptional cases phlyctenulae, vesicles and pustules develop upon the nodes. Complications involving internal organs are rare. Angina lacunar is noted. Articular involvement, although infrequent in childhood, deserves special mention, as it demonstrates the relation of this condition to rheumatism. Endocarditis, nephritis and pleurisy belong to the rarest complications.

In discussing idiopathic erythema exudativum multiforme the writer notes the greater diversity of the eruption.

There are less marked constitutional symptoms in uncomplicated cases.

The subjective symptoms are mostly unimportant. Prodromata were noted in but 1 case.

Under the head, the symptomatic form of erythema nodosum and erythema exudativum multiforme, Schlesinger discusses symptomatology and occurrence.

As to a comparison of the three forms of erythema: The chief anatomical difference between erythema nodosum and erythema exudativum multiforme lies in the fact that the superficial layers of the cutis and subcutaneous tissue are involved in the latter, whereas in the former infiltration of the deeper layers of the subcutaneous tissue exists.

The fact that the lesions of both forms of erythema may occur in the same subject forms the chief argument of those who classify the two types as one. Such transitions frequently occur in the symptomatic form. Erythema nodosum, especially that form which attacks children, is a typical exanthematic infectious disease with stages of invasion, eruption and constitutional symptoms.

Erythema exudativum multiforme is in most respects a purely local, painless skin disease, although it runs a cyclical course, indicating a toxemia. The signs of infection are, however, subordinate to the skin lesion.

Bacteriologic study in erythema nodosum has brought for the most part negative results. Occasionally staphylococci and streptococci were found. These in all probability point to a mixed secondary infection. The writer believes that a bacteriologic examination of the tonsils in cases of angina occurring in erythema nodosum might lead to more definite results. In cases without articular involvement only staphylococci were found.

Erythema nodosum may be caused by bacterial emboli in the capillaries, or by toxins circulating in the blood. In erythema exudativum multiforme it is considered more probable that toxins circulating in the blood are causative. Further bacteriologic study is needed for the establishment of this theory.

Taylor, J. Madison: Hypothesis on the Etiology of Scoliosis in Children. (*Monthly Cyclopedia of Practical Medicine*, July, 1905, p. 303.)

The postulates are laid down that few or no pathologic processes can exist in the body without manifesting themselves by disturbances in the nervous mechanism of the area or parts involved, and that explanation of the visceromotor and other activities must be sought through a practical knowledge of the vasomotor mechanisms and functions of the spinal segments through which the viscus is controlled.

The author has observed that after prolonged pulmonary disturbance there is a marked derangement in the alignment of the upper dorsal vertebra, and that in cases of protracted disorder of the digestive organs there are noted similar disorganization of the lower dorsal and upper lumbar vertebra. These cause the spinous processes to be at varying distances apart, or more prominent or out of the vertical line, results due to loss of tone and relaxation in the supporting ligaments. The hypothesis is broached that if these conditions persist permanent lesions and deformities may result. Prophylaxis consists in correcting the visceral disorder and in manipulating the spine.

Armstrong, H.: The Second Dentition: Its Medical Aspects. (*The Lancet*, June 3, 1905, p. 1,489.)

The author considers the subject under three heads: (1) General or local disease as a cause of faulty dentition. (a)

General disease. Rickets, cretinism, hereditary syphilis, and the acute exanthematous diseases may retard the appearance of the second set of teeth and also render them irregular and of poor quality. (b) Local disease. Adenoids, thumb sucking and alveolar abscesses have a baneful influence on the second teeth. (2) Faulty dentition as the cause of general or local disease. Pain and swelling in the gums is the usual event of the second teething. The carious remains of the first teeth, or the early decay of the first molar, may lead to a stomatitis. The glands in relation are often enlarged but seldom suppurate. (3) By reflex action the second dentition often affects existing diseases, as epilepsy and chorea.

Townsend, Charles W.: A Case of Hemorrhagic Disease of the Newborn. (*Boston Medical and Surgical Journal*, June 1, 1905, p. 638.)

A male infant born after a normal labor, during its first sixty hours of life, had several cutaneous hemorrhages, vomited bloody mucus, passed several large bloody stools, and bled profusely from the navel. Nitrate of silver and iron were applied to the navel without result. At last gelatin dissolved in water was given from a bottle. This was aided by digital compression of the navel and the local application of adrenalin solution, 1-1,000. In twelve hours the temperature fell from 101°F. to 99.6°F., and all bleeding both internal and external ceased. There was no recurrence.

Harland, W. G. B.: Papillomas in a Syphilitic Child, Occluding Both Nostrils. (*American Medicine*, April 1, 1905, p. 536.)

An eight-year-old colored boy came to the Presbyterian Hospital with soft tumors arising from the base of each nostril. These had existed two weeks, obstructed respiration and had a thin mucopurulent discharge. The nose was broad, somewhat sunken at the bridge, and the head suggested congenital syphilis. The tumors were papillomas, covered with a thin, pale, tough epidermis. Under the administration of mercury and potassium iodid with the local applications of silver nitrate the growths disappeared. A large septal perforation was then seen and a swelling of the mucosa of the floor of the left nostril.

Koplik, H.: The Frequency, Prognosis and Treatment of Lobar Pneumonia in Infants and Children. (*Boston Medical and Surgical Journal*, June 29, 1905, p. 741.)

Among the author's 839 cases of pneumonia, 69 per cent. occurred before the end of the first two years. He found the right upper lobe to be the most often affected, and that central pneumonia is rare in children. The prognosis is not good for the first two years of life, but excellent from then until the tenth year. In the matter of treatment he advises that the temperature be reduced by cool sponging or cool compresses when it reaches 104°F. If cardiac support is needed he uses tincture of digitalis and whiskey. If there is cyanosis, nitroglycerin, $\frac{1}{100}$ to $\frac{1}{150}$ grain is useful. Strychnin should be used in moderation. The child should have a light, nutritious diet with plenty of water, and should be disturbed as little as possible. Pain should be allayed with either codein or paregoric. Tympanites calls for calomel in large doses.

Gordon, A. K.: A Note on the Treatment of the Toxic Symptoms in Scarlet Fever. (*The Lancet*, June 3, 1905, p. 1,496.)

The author reports that out of 55 cases of severe toxic scarlet fever, treated with mixed or polyvalent antistreptococcic sera, 43 recovered. He used the serum in doses of from 20 to 100 cc., and had no ill effects. He advises the early administration of large doses as early as the toxic nature of the disease is recognized.

Barnes, N. P.: The Treatment of Enuresis in Children. (*American Medicine*, June 24, 1905, p. 1,021.)

The writer gives the causes of enuresis as organic: (1) Malformation; (2) inflammation; (3) nervous abnormality; (4) disturbed nutrition. Functional: (1) Uneducated and untrained; (2) an undeveloped mental state; (3) autointoxication; (4) neurosis; (5) hyperemia; (6) local reflex irritation; (7) remote reflex irritation. He advises removal of the cause when possible, careful feeding with tonic medication, regulated exercise, and where possible an appeal to the child's sense of shame.

Barras, W. G.: Outbreak of Enteric Fever the Result of Infected Ice-cream. (*The Lancet*, November 5, 1904, p. 1281.)

Dr. Barras describes a local epidemic of enteric fever in Govan, Scotland. Beginning on September 20th, 19 cases developed in five days. On investigation it was found that all the cases had eaten ice-cream manufactured by an Italian in the district who had been ill since September 4th, and whose blood gave a typical Widal reaction in a dilution of 1-30. The ice-cream was destroyed and no new cases developed.

Wilkin, G. C.: The Prevalence of Adenoids in Country Districts. (*Medical Press*, June 7, 1905, p. 589.)

The author in calling for a committee of investigation states that he has found a very great number of cases of adenoids in children in the rural parts of Sussex, Somerset, Northampton and Devon. And to this fact he attributes the extreme frequency of ear troubles in those counties.

Hill, Hibbert Winslow: Innocent Cases Reported of Diphtheria. (*Boston Medical and Surgical Journal*, December 15, 1904.)

Dr. Hill shows that of all the cases diagnosed as diphtheria by physicians, only about 62 per cent. are confirmed by culture. On this ground he urges a more universal use of the culture tube as a method in diagnosis.

Jukowski, W. P.: A New Sign of Hereditary Syphilis. (*Med. Obs.*, lxiii., No. 7, p. 473.)

The author begins with a short critical survey of the usual symptomatic aids to the diagnosis of hereditary syphilis and pronounces most of these signs and symptoms to be inconstant and unreliable. He then describes a new sign which consists in a peculiar dryness and mobility of the epidermis. In the newborn presenting slight atrophy we find this phenomenon only in certain regions, as on the chest, the abdomen, the neck, sometimes only on palms and soles. In cases of syphilis, however, the entire skin is loose and covers the underlying cutis like a thin shirt. When the child moves, this loose epidermis is thrown into folds and presents a curious wavy surface. The entire picture is very characteristic and cannot be mistaken for anything else. So

much can be observed immediately after birth. In a few days the appearance of the skin slowly changes, owing to deep cracks which now come to view and to the accompanying desquamation. The fissures go through the entire skin, and the bleeding stripes and spots give the surface a variegated aspect. There is no icterus. In severe cases the infants were completely aphonic and died within six days. No other known symptoms of syphilis were present in the cases studied by the author. This new diagnostic feature, if it can be confirmed, will evidently acquire great importance, owing to its very early presence.

The author also goes into a discussion of the histological bearings of his symptom.

SURGERY.

Ring, G. O.: Orbital Sarcoma, with Report of a Case and a Discussion of Radical Operation, X-Ray Therapy and Electro Chemical Sterilization. (*New York and Philadelphia Medical Journal*, June 10, 1905, p. 1,159.)

A girl, aged six years, had suffered from impaired respiration and a mucous discharge from the nose for several months. These symptoms ceased and exophthalmos of the left eye appeared, the eye protruding three quarters of an inch. The eyes were normal in vision. Motion of the left eye was limited in the vertical direction. It was impossible to replace the eye into the orbit. Palpation showed a firm, nodular mass on the superior wall of the orbit. Ligation of the internal carotid was done. The improvement which followed lasted only two weeks. Three months later the author, assisted by Dr. Jos. Gibb, enucleated the eye and removed the growth which was declared to be a non-pigmented, round-celled sarcoma.

After a careful study of the literature the author concludes:—

- (1) An exploratory incision is justifiable when orbital sarcoma is suspected.
- (2) The successful results obtained by same with the x-ray justify its trial.
- (3) As orbital sarcoma usually recurs, the operation should be limited to the removal of the growth.
- (4) If the tumor is capsulated, removal without orbital evisceration is sufficient.
- (5) The results of cataphoric sterilization

elsewhere in the body warrant the trial of this method in the orbit, care being used in regard to the strength of current employed.

Cowes, W. P. and Robey, W. H., Jr.: Post-Operative Erysipelatous Dermatitis in a Child of One Month ; Recovery. (*Boston Medical and Surgical Journal*, December 29, 1904, p. 719.)

An Italian infant of one month was admitted to the Boston Dispensary on April 25th to have removed from the shoulder a congenital, lobulated, movable tumor the size of a walnut. The surface was slightly reddened. The tumor, a lipoma, was removed under ether April 28th. In a few days the edges of the wound reddened and it was drained. On May 14th the wound was healed, but a marked blush occurred over the right arm and shoulder. May 15th the right side was nearly free, but the left arm and shoulder were affected. Temperature 106°F. Prostration marked. On May 19th the upper part of the body was free, but the child had a severe diarrhea and the blush appeared on the right leg and thigh. May 20th, the scrotum and penis became edematous. A septic finger was incised. Temperature 101°F. May 22d, the entire scrotum and one-half the penis became gangrenous. There was paraphimosis. White blood count 22,000. June 3d, the sloughs were disappearing and the area granulating. Cultures showed staphylococcus alone, though the infection was undoubtedly due to the streptococcus (*sic.*). The treatment was supportive with free aseptic dressing.

Barlet, Jehan: A Case of a Twisted Ovarian Pedicle in a Child; Operation; Subsequently a Twisted Ileum; Operation; Recovery. (*British Medical Journal*, December 3, 1904, p. 1517.)

A girl aged ten was admitted to the French hospital on August 8th with a large painless tumor in the left iliac fossa. No disturbance of function was noted, and the only pain was three weeks before when she had some cramps and vomited.

Examination under chloroform showed absence of fluctuation and a displaced uterus. On August 18, Mr. Edmund Owen removed the tumor, which was an ovarian cyst containing blood, hair and sebaceous matter. The pedicle had a three-quarter twist.

Five days after the operation clonic spasms with great prostration and vomiting set in and the diagnosis of intestinal obstruction was made. The vomiting increasing and the abdomen becoming tense the wound was opened and a greatly distended twisted loop of small intestine was found adherent to the site of the cyst.

The complete twist was undone, the peritoneum washed with hot saline solution, and the wound closed. Recovery was slow but complete.

Swift, H.: Tetanus in Children. (*Australasian Medical Gazette*, June 20, 1905, p. 251.)

The author gives his notes on 2 cases in children under seven years. The first patient died, no serum being obtainable; the second patient recovered after repeated injections of the serum. He then discusses the literature of tetanus. He concludes that the rational treatment of tetanus is the injection of antitetanic serum as early as possible and a vigorous antiseptic treatment of the wound.

Clubbe, C. B. P.: One Hundred Consecutive Laparotomies for Intussusception in Children. (*British Medical Journal*, June 17, 1905, p. 1,327.)

Of these cases, 64 were ileocecal; 12 ileocolic; 20 double; 3 colic, and 1 enteric. The operation was successful in 63. The author lays stress on the diagnostic importance of the mode of onset. He irrigates all cases before operation to reduce partially the intussusception. He advocates an incision along the outer side of the rectus muscle or one having the umbilicus as its centre. He always gives morphin $\frac{1}{20}$ to $\frac{1}{40}$ grain after the operation.

Souter, C. H.: Case of Congenital Absence of Continuity Between the Larger and Smaller Intestines. (*The British Medical Journal*, December 3, 1904, p. 1512.)

When seen the child, a male infant, forty-eight hours' old, had one small stool and had vomited everything taken. The family history was negative. On examination the child was found to be jaundiced, and vomited frequently a green, foul smelling fluid. The rectum was pervious, the bowel being small and empty. A mass was felt in the right iliac region. Pulse feeble, temperature

subnormal. An incision made in the right iliac region disclosed the bowel greatly distended with feces, and an artificial anus was hurriedly made. The patient died from exhaustion in ten days. At autopsy the small intestine was found to end one and one-half inches below the incision in a cul-de-sac, while the large intestine ended at the sacrum. Between the ends was some loose mesenteric tissue.

Vitry, M.: Invagination of the Appendix and Ileo-Cecal Valve with Secondary Intussusception of the Cecum and Ascending Colon. (*Annales de Méd. et Chir. Inf.*, February 1, 1905, p. 86.)

A child having fallen upon his abdomen, was seized fifteen minutes later with violent abdominal pain, and vomiting followed.

The patient was confined to his bed for three weeks, and a physician made the diagnosis of typhoid fever.

Abdominal pain and vomiting continued and the child was taken to the Trousseau Hospital, remaining there eight days. A diagnosis of floating kidney was made. Upon admission to the Pavillon Pasteur an elongated tumor was found, extending from right to left, and somewhat obliquely placed.

The tumor followed the respiratory movements. There was hepatic dulness.

The radiograph failed to elucidate the case. At times the tumor was not palpable. After a renewed attack of enterocolitis the mass again became palpable.

Upon operation the stomach was found to be dilated. In the cecum there was a tumor which was formed by a portion of the cecum and 2 cm. of the appendix, as well as the ileocecal valve, these structures having become invaginated in the cecum. The appendix was about the size of a small finger.

Disinvagination of the appendix and ileum was readily accomplished. Invagination could be reproduced at will by gently pushing the appendix toward the cecum.

Two stages were noted: First, the passing of appendix and ileum into the cecum, and second, the passing of the mass thus formed into the ascending colon.

The appendix was removed. In order to prevent intussusception of the cecum and colon a longitudinal fold was made in the gut, catgut being used.

Invagination of the appendix is not rare, several cases having been reported.

The sudden onset noted in this instance is exceptional; in most cases of chronic intussusception colic occurs, and diarrhea alternates with constipation.

Diagnosis of this condition is difficult, and errors are very frequently made.

HYGIENE AND THERAPEUTICS.

Cheever, David: Cardiac Collapse During Examination of a Post-Pharyngeal Abscess; Incision; Circulation Reestablished and Maintained for Four Hours by Massage of the Heart; Death. (*Boston Medical and Surgical Journal*, January 5, 1905, p. 10.)

In this case the patient was a three year old girl, greatly exhausted from a retropharyngeal abscess of two weeks' duration. While the point of fluctuation was being sought for preparatory to incision, she stopped breathing. The heart sounds were absent. She was inverted and the abscess incised while artificial respiration was maintained by means of a No. 28 French rubber catheter in the trachea. Cardiac massage by rhythmic pressure on the thorax was resorted to and cardiac injections of brandy and strychnine were given. The trunk and limbs were bandaged and the abdomen compressed. The color improved and there was a fair artificial pulse. Oxygen, saline infusion and adrenalin were tried without result. The body heat was kept up by hot blankets, etc. After four hours and a half rigor mortis set in and the efforts were abandoned. The author advises great caution in dealing with pharyngeal cases and considers the advisability of doing a preliminary tracheotomy.

Kitasato, S.: The Behavior of Native Japanese Cattle in Regard to Tuberculosis (Perlsucht). (*American Medicine*, January 7, 1905, p. 13.)

Dr. Kitasato presents tables showing that tuberculosis exists to the same extent in Japan as elsewhere, and that this is true even in districts where the native cattle are the only source of the milk supply. He also shows that primary intestinal tuberculosis

occurs in 10 per cent. of all cases despite the fact that the average daily consumption of milk is only 2,825 cc. per capita, and that cow's milk is rarely used for infant feeding.

He then reports the results of inoculating fifty-two native cattle with virulent cultures of bovine and human tuberculosis with negative outcome, while of a like number of mixed cattle nineteen were infected with perlsucht.

In conclusion he states that: (1) Human tuberculosis is in Japan as elsewhere. (2) Primary intestinal tuberculosis is relatively common in both adults and children. (3) There are large districts where despite the presence of human tuberculosis there are no affected cattle. (4) That cattle are not susceptible to human tuberculosis under ordinary conditions. (5) Under natural conditions Japanese cattle are very resistant to perlsucht, even when injected. (6) The imported and mixed herds are very susceptible to perlsucht, but neither native nor mixed cattle are infected by human tuberculosis.

Motschan, W. O.: A Case of Noma Cured by the Use of the Red Light. (*Jahr. für Kinderh.*, Vol. 40, 1905, p. 241.)

The writer states that phototherapy has recently accomplished unexpectedly good results. Motschan's patient was nine years old; his father was alcoholic; his mother anemic. No history of syphilis nor tuberculosis obtainable. The patient was bottle fed and rachitical, suffering frequent attacks of bronchitis. When about one and a half years old he was taken to St. Petersburg, where the family inhabited a small, cold, damp room. An attack of diarrhea lasting one month followed; attacks of vertigo supervened and bronchitis recurred.

On November 13, 1900, he entered the hospital connected with the barracks because of an attack of scarlet fever. On the thirty-ninth day of this disease varicella developed; twelve days later cervical lymph adenitis was noted—the abscess was incised and the patient gained steadily in weight for some time. On the fifty-ninth day of illness measles broke out and two weeks later double pneumonia supervened, running a subacute course. On the seventy-ninth day symptoms of acute enteritis were observed, and hearing was dulled, otorrhea beginning about ten days later as a symptom of otitis media. On the eighty-seventh day the patient complained of toothache, and three days later a slight swelling was seen upon the inferior alveolar process near the second left molar.

Between the root of the tooth and the gum there was a small swelling, from which a little pus and detritus escaped. Two days later a small swelling appeared upon the inner surface of the mucosa at the angle of the mouth. A tendency to spread was noticed.

Bacteriologic examination of the exudate showed strepto- and staphylococci. Twenty days after infiltration of the gum, perforation took place. On the same day physical examination revealed a cavity in the left lung. Necrosis rapidly became more extensive, the patient losing weight. In the lower portion of the left cheek a large perforating ulcer of oval form was seen; the wound was so painful that the mouth was opened with difficulty. Upon admission the patient was isolated. Local treatment consisted exclusively of the red light. Improvement was very soon noted and pain ceased on the third day after admission. The odor from the wound diminished. Ten days after arrival of the patient the anterior half of the wound was granulating. Subsequently the patient was shown to the St. Petersburg pediatric association, and at that time only a small triangular cicatrix remained.

Treatment of noma by means of the red light was first employed by Professor Ssokoloff in 1900. To what extent the red light can be used in cases of noma remains to be seen. In the opinion of the writer it improves nutrition, has a dessicating effect and diminishes pain. Further clinical study is required in order to verify this view.

McCullagh, H. W.: The Treatment of Diphtheria. (*Dublin Journal of Medical Science*, June, 1905, p. 432.)

The prophylactic treatment of diphtheria comprises the isolation of the patient, the administration of antitoxin to all exposed persons, the destruction or sterilization of all objects in contact with the patient, and the free use of antiseptics by those exposed. The patient should receive large and early doses of antitoxin, perhaps intravenously, and if there is an associated streptococcic infection, antistreptococcic sera may be tried. Antiseptic sprays and washes may be applied locally. Steam inhalations and emetics may relieve dyspnea. Nasal cases should be irrigated. The author prefers tracheotomy in private practice. To aid the sera he recommends perchlorid of iron 5-20 m with quinin gr. j every two to four hours. With this may be given potassium chlorate 1 to 5 grains. Complications should be watched for.

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Original Communications.

CASE OF SEPSIS IN A NEWLY-BORN INFANT.*

BY A. JACOBI, M.D., LL.D.,
New York.

G., male, 862 Park Avenue, was seen at 9 P.M., April 5, 1905, with Dr. Baran. Is the third child of the family. No miscarriage. First child was an eight months baby; died on the second day. Mother had been sick and under treatment for several months previously. Second child was delivered by Dr. Baran, and is in good health. No family disease, particularly no hemophilia.

History.—No written records were kept. The following history was elicited from the physician: Nothing was noticed until the fourth day. Then heavy uric acid infarctions were discharged. That lasted until the eighth day. It recommenced on the ninth and lasted to the tenth day. Urine was pale on the eleventh. No examination was made. Quantity fair. Circumcision on the eighth, with no accident. Purpuric spots of small size were seen on the extremities on the ninth day.

Hematuria appeared on the twelfth and continued. On that day a consultant was called in. He found what has been described, and both kidneys swollen. Is reported to have diagnosed tumors of both kidneys.

The cord fell off on the fifteenth day, April 4th. Was seen by me on the sixteenth, April 5th, 9 P.M. Air of the room good; window had been kept open; bedding clean; plumbing appears to be in order. Mother in fair health; sitting up; has no fissures in her nipples. No history of tuberculosis, or syphilis. Baby still weighs nearly six pounds; is said to have lost considerably. Mouth and nose normal; lips dry; somewhat fissured in the corners. Ears appear negative. No diarrhea. No malformation. Purpuric spots, small and large; some with slight elevation of the

* Read before the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 18, 1905.

surface, over chest and epigastrium; some on face, shoulders, arms, fingers. Some painful livid elevations (suggesting the presence of pus in the deeper tissue). Icteric discoloration not noticeable in gaslight; is reported to be trifling. The liver large, as usual at that age. The spleen was not felt; percussion negative. The right kidney was not felt. The left kidney felt like the size of a hen's egg, hard and smooth. Respirations about 60; pulse 200; temperature 104.5° F. Heart negative. Umbilical stump has some bloody oozing; is covered with some boracic acid, with which it has been dressed all along. The condition of the child appeared to warrant no close examination of the lungs, nor of the blood; no vein being in view or accessible under the circumstances. The baby died the next day.

Autopsy at 9 P.M., six hours after death. Surface as described in the living; some of the spots paler; some more livid. A moderate amount of serum, tinged with blood, in the pericardium. On it numerous petechiæ. Heart negative; thymus small, negative. Four of the lobes of the lungs have disseminated hemorrhages; some quite superficial, pleural and subpleural; some infarctions, mostly triangular of $\frac{1}{2}$ - $\frac{3}{4}$ cm. in depth. Some atelectatic places in both sides posteriorly. Peritoneum holds a few ounces of blood-tinged serum, and shows a few petechiæ on the abdominal wall. Both costal pleuræ covered with petechiæ, and a few extensive extravasations. Liver as large as normal; negative. Umbilical vein and ductus Arantii, normal; not ulcerated. Spleen small; negative. Stomach exhibits circumscribed blood points in the mucous membrane. Many extend down to the submucous tissue. These changes are mostly found in the pyloric part.

Umbilical stump large; slightly eroded; covered with a scab of coagulum and boric acid. The pelvic connective tissue is black with blood. Both adrenals small; rather more so than normal.

Left kidney enlarged to almost twice its size; dislodged downwards from 4 to 5 cm.; capsule penetrated with blood; some clots between capsule and kidney; no open blood vessel found; capsule also thickened with fat. The upper part of the kidney forms a black, almost uniform looking mass, which so swells the tissue that fetal lobulation becomes indistinct. The right kidney is similarly changed, but to a far less degree. Section of the left kidney exhibits some small uric acid infarctions which are still held in the pyramids.

A few points are of unusual interest:

1. Uric acid was discharged in large quantities from the fourth to the eighth day; then again from the ninth to the tenth. Small hemorrhages, with or without secondary nephritis, are not very rare after uric acid infarction, but the suspicion that the foreign bodies might have caused the hematuria was soon dismissed.

2. It is certain that almost every floating kidney found in early age is congenital. As this baby had been lying down all the few days of his life, the increase in size should not be charged to the dislodgment of the left kidney.

3. The diagnosis of intra-abdominal tumors, until it be quite positive, should be suspended even in infants and children in whom intestinal contents are rarely misleading. Besides, what we feel inside is exaggerated by the mass at least of abdominal wall which has to be grasped on both sides of the questionable body. The left kidney *was* enlarged by hemorrhage, and was abnormally accessible, and the tumor of a kidney might be suggested by the findings. Still, very few tumors of a kidney ever bleed. Carcinoma does bleed sometimes; sarcoma very rarely; calculi in later life; tuberculosis not in the newly-born; cysts and hydronephrosis not at all.

4. The bacteric cause of this sepsis is not known; nor can we know the mode of its invasion. The amniotic liquor and the milk and lochia of the mother should not be accused as long as she was well and other causes cannot be found. The skin exhibited so many changes that its condition one or two weeks previously can only be guessed. The lips were sore at a late date. The umbilical stump was sore and bleeding. The cord had not fallen off before the fourteenth day; invasion is quite possible during that long time of the cutting of the cord (even the very tissue of the cord, unchanged, may admit microbes, or toxins); and boracic acid is probably not a sufficient antiseptic to be applied as a protection to a vulnerable surface like that of the navel.

DISCUSSION.

DR. HOLT.—I saw this case when the child was living. It was obscure then and I do not know that it is entirely clear to my mind now. Dr. Jacobi has given an excellent description of the specimens but has not pictured the wretched condition of the child. It weighed something like 7 or 8 pounds at birth. When

I saw it the temperature was subnormal and all symptoms indicated a severe grade of inanition. The only striking thing found when I examined the baby was this tumor felt in the region of the left kidney. It was as large as a lemon at that time. The urine was bloody. The mother had practically no milk and the child was nursing on dry breasts.

I was puzzled as to the nature of the disease, but thought probably there were uric acid infarctions and a secondary acute hemorrhagic nephritis. The diagnosis of a neoplasm was also considered as possible. In view of the autopsy findings, sepsis seems to be the only explanation, and yet it is hard to see why one kidney should have been more affected than the other.

DR. HUBER.—In this connection, I should like to read the report of a case of sepsis in a very young infant, the point of entrance being the integument.

ACUTE EMPYEMA IN AN INFANT FIVE WEEKS OLD DUE TO
STAPHYLOCOCCUS INFECTION.

Baby A., male, born April 5, 1905; normal delivery; weighed at birth six pounds; no tubercular or specific trouble. A few days after birth, small superficial pustules were seen upon various portions of the body. Successive crops appeared during the following four weeks. The circumcision wound and umbilical stump did not present any abnormality. When child was eleven days old, two small furuncles appeared upon the scalp, these healed kindly in about ten days. Nothing abnormal in mouth, nares or about the ears. During this time baby took both breast and bottle; its general nutrition was fair; stools greenish.

May 3d cough appeared, slight temperature was noticed; three days later temperature 102° F. Cough persisted and temperature continued, ranging between 100° and 104° F., until May 10th, when fever subsided. Respiration was accelerated, 50-60-70 per minute. On the eighth day (May 11th) some dullness was noticed on the left side posteriorly, which gradually became more pronounced, and at the end of the second week it was absolutely flat. During the second week the temperature was 99.5°, morning, and 100° to 101.5° F., afternoon. General condition better than during first week; breathing rapid and superficial, but not labored. Edema was observed about this time (urine negative); heart's action good throughout the course of the disease.

On the fourteenth day of his illness, the exploring syringe revealed pus. The bacteriological examination showed staphylococci only. The same afternoon the child was operated upon by Dr. Ladinski (simple incision and drainage with tube). The subsequent dressings were made by Dr. Rabinowitz. Recovery

was uneventful; the wound had practically healed by June 12, 1905.

In going over the points of the history, we find that in all probability the infection took place through the tender integument in some one or other of the numerous pustules present. The umbilical and circumcision wounds both had healed without any trouble; furthermore, there were no manifest lesions in the mouth, nose or ears. The pus did not contain any pneumococci or streptococci, only staphylococci. The purulent collection in the left pleura must be regarded as the final onslaught of the staphylococci infection, originating in the skin. Fortunately the process ran a subacute course, and the final result, in spite of the tender age, was very satisfactory.

DR. KOPLIK.—Of great interest, and bearing directly on Dr. Jacobi's case, I would relate a case which I saw in consultation. The child was nine days old and in perfect health up to the time of a ritual circumcision. The parents informed me that the operator used a knife that was not bright and was supposedly not clean. The parts were sucked to stop hemorrhage. Six hours later the child developed a hemorrhagic swelling about the wound and petechiæ all over the body. When I saw the child the next day it was dying, only twelve to sixteen hours after the operation. The body was black and blue as a result of hemorrhages and looked as if it had been beaten. The spleen was enlarged, and there was marked dyspnea. I mention this case to show how rapidly sepsis may develop through the introduction of streptococci into a fresh wound from the mouth. May not a similar factor have entered into the case recorded by Dr. Jacobi?

DR. EDSALL.—Dr. Jacobi may be interested to know that at the last meeting of the Philadelphia Pathological Society Dr. David Riesman reported several cases in newborn infants in which the chief lesion was hemorrhage into the kidneys, resembling exactly the kidneys that Dr. Jacobi has shown. In one or two of the cases he found a general staphylococcus infection. The lesions were limited solely or almost entirely to the kidneys, and Dr. Riesman described the condition as probably a pathological entity.

DR. SAUNDERS.—I think it is pretty well established that any infection in the newborn is liable to take on a hemorrhagic character. Whatever the organism may be, the infection is likely to be hemorrhagic and fatal.

This case reminds me of one that was seen some years ago and remains a puzzle to this day. It was a newborn infant and the condition was marked by high temperature. At autopsy one kidney was found very much enlarged and looked like a spleen. I had cultures made from the kidney, but nothing was found. I

have also in practice met with 2 or 3 cases in which I was tempted to make the diagnosis of rapidly growing neoplasm of the kidney. One of them proved to be a protracted case of malaria; I had given a bad prognosis, but the child is now large and healthy.

I should like to know from the members of this Society if in an acute fever they have been able to palpate the kidneys, increasing in size like the spleen in typhoid fever, and yet the child get well.

DR. JACOBI.—My object in reporting the case was to point out the danger of diagnosing a tumor under such circumstances. Dr. Holt had been under the impression that there was a tumor in this case, and as he was mistaken, I thought it worth while to report the case in connection with that possibility.

Secondly, it is a case of sepsis undoubtedly not of the usual kind. Most of the cases have been decidedly umbilical. Sepsis may be the result of absorption from the stump; in the large majority of cases we find some traces in the umbilical vein. This vessel was absolutely normal in this case. The first appearance of anything abnormal was in the lungs and these were filled with infarctions. Then there were hemorrhages in the skin and under the skin, in both kidneys and on the pleura, as we may see in any extensive sepsis. The question was, Where the sepsis arose and when? When I saw the case the skin and mucous membranes of the nose and mouth had undergone changes from day to day. Sepsis may have originated from them, or through the tissue of the umbilical cord long before it fell off.

Sepsis is more common, I believe, than many of us have thought. Babies die after a few weeks of what is called pneumonia. If babies were examined more carefully and temperature records kept, we might find sepsis more frequently. The infection may be a sudden one. According to a number of observers it takes from six to eight hours from the time of establishment to the showing of the first symptoms. But in Dr. Koplik's case it is possible, of course, that the baby was septic before the circumcision, and, in the case I saw, there may have been something before that I did not know of.

The Enzymes in Various Kinds of Milk.—In a series of comparative investigations on the enzymatic content of different kinds of milk, A. Zaitschek (*Pflüger's Archiv.*, September 30, 1904) finds that woman's, mare's, cow's, ass's, goat's and buffalo's milk contain no peptone, neither pepsin nor trypsin, no glycolytic ferment, but they all contain, in their fresh state, without exception, a diastatic enzyme.—*Medical News.*

CHRONIC CONSTIPATION IN CHILDREN.

BY HERMAN B. SHEFFIELD, M.D.,

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Judging by the construction of the infantile intestines—their great length, the thinness and feebleness of their musculature, etc.—nature seems to have intended that infants as well as older children should be more or less constipated. Indeed, the popular belief that healthy children are usually constipated, is often corroborated by actual observation. Not infrequently, however, obstinate constipation gives rise to a number of disagreeable symptoms (flatulence, anorexia, headache, restlessness, sometimes convulsions, proctitis, anal fissure, prolapse of the rectum, hemorrhoids, etc.), requiring active treatment, a task often difficult to cope with in view of the uncertainty of the etiological factor of the underlying disease.

The causes of habitual constipation are very numerous. Aside from the cases resulting from gross abnormal anatomical relations, or diseases, such as the different varieties of atresia intestini, recti, or ani; tumors, congenital dilatation with hypertrophy of the colon; hypertrophy of the valvulæ connivantes; hypertrophy of the so-called rectal valve; inflammatory adhesions; congenital displacements, etc.—which will not be discussed here—constipation is ordinarily caused by faulty diet, atony of the bowels, and constitutional disturbances.

Faulty diet is responsible for a great many cases of constipation. This etiological factor is frequently potent also in infants, when the woman's milk contains too much or too little of one or more of the constituents of milk, or is insufficient in quantity. In artificially fed infants the cause of the constipation will probably be found in the insufficiency of fat consumed. In some children constipation is due, on the one hand, to too early and persistent feeding with amylacea, and on the other, to the consumption of food that does not stimulate peristalsis, such as an exclusive diet of milk, meat, eggs, etc., and no potatoes, bread, vegetables, etc.

Atony of the intestines may be primary, congenital in nature, or secondary or acquired. The former variety can frequently be traced as an hereditary taint through several generations. Sometimes there is, in addition to the muscular insufficiency, also congenital weakness of the innervation of the intestines. The latter condition embraces also the form of atony usually associated with congenital diseases of the brain and spinal cord. Secondary or

acquired intestinal atony is generally the result of repeated attacks of temporary constipation, gastrointestinal indigestion with fermentation, enterospasm, arrest of peristalsis due to reflex irritation of the inhibitory nerves of the intestines, acute inflammatory processes of the intestinal canal with consecutive atrophy of the intestinal coats, constriction of the lumen of the bowels by temporary displacements (enteroptosis, hernia, etc.) ; habitual suppression of defecation or attention to it at irregular hours ; enemas with large quantities of fluids, etc. All these etiological factors produce intestinal atony by directly or indirectly distending the lumen of the bowels and depriving the intestinal musculature of its resilience and tonicity. The latter condition is also apt to follow the abuse of antispasmodics, while drastic cathartics may lead to atony by mechanically thinning the intestinal coats.

In different chronic diseases associated with general debility (*e.g.*, rachitis) and loss of flesh ; in diseases of the nervous system, such as locomotor ataxia, myelitis, meningitis, etc., the sluggishness of the bowels forms merely a symptom of the principal disease. Habitual constipation is often met in diseases of the heart, profound anemia, etc., as a result of venous stasis of the abdominal organs ; to the same cause is attributable also the constipation occurring in children who through deformity or otherwise are incapacitated to enjoy a sufficient amount of bodily exercise.

The *treatment* of obstinate constipation in infancy and childhood resolves itself, firstly, in arresting the causes instrumental in the production of the disease ; secondly, in the removal of the damage done during the continuance of the constipation—not quite as easy a task as some authors wish us to believe. Indeed, a good number of cases of chronic constipation are never cured, no matter what therapeutic means are being employed. Preventive measures are, therefore, to be recommended early and carried out with precision.

It is of primary importance to train the child to have a movement regularly every day. “Even in infants only a few months old proper habits are often easily formed if the child is put upon the chamber or chair invariably at the same hour.” The first few days it may require local stimulation to defecation (*e.g.*, introduction into the rectum of a small oiled syringe-tip). Similar means should be employed also with older children and particularly school children who are very apt to suppress nature’s impulse to empty the bowels.

Two main factors are instrumental in the expulsion of the rectal contents, contraction of the abdominal muscles and the diaphragm, and separation or relaxation of the gluteal group of muscles. "When the child is old enough to be placed upon a commode chair it is often in such a position as to make defecation very difficult indeed. Its trunk is bolt upright, the feet dangle from a seat which is too high, and the expulsive power of the abdominal muscles is reduced to a minimum. Besides, the aperture in the seat is so wide that no support is given to the tubera ischii, the gluteal masses are crowded together instead of separated and the descent of the floor of the perineum is much hindered." This impediment to defecation may be obviated by substituting a low seat on a nursery chair or closet or small vessel for the high one previously used. The child is thus enabled to accomplish this act in a squatting posture which is most favorable to the thorough emptying of the rectum.

Correction of diet is, of course, very valuable for the prevention of habitual constipation, but does not always remedy the trouble. This is particularly true of cases of very long standing, since here we are dealing with secondary atony following prolonged distension and enfeeblement of the intestines. With the introduction of the recent methods of percentage feeding and the employment of "top milk" as a base, and barley- or oatmeal-water as a diluent, the number of cases of obstinate constipation among bottle-fed infants, due solely to faulty feeding, has perceptibly diminished. Hence, the indication of these methods of feeding also as a corrective of constipation. In breast-fed infants attention should be directed to the improvement of the general nutrition of the mother or wet nurse. Frequently, however, it is almost impossible to regulate the quantity of fat in breast-milk. In this event the deficiency in fat may be supplied by administering to the infant, just before nursing, a teaspoonful or two of sweet cream. The addition of cream, malt preparations, buttermilk, honey, an extra supply of cooked or raw fruit and vegetables to the regular "mixed-diet" is invaluable as a corrective of constipation also in older children. A glass of cold water on an empty stomach and at night before retiring is often very useful.

Faithful compliance with the suggestions just made very often yields favorable results. In a certain percentage of cases, however, more active measures have to be resorted to and it then devolves upon the physician to select such therapeutic means as

will not affect the general well-being of the patient. This indication can most appropriately be met by the simultaneous employment of a combination of the so-called physico-chemical procedures, consisting of massage, oil enemas and hydrotherapy, and occasionally, also, electricity. This treatment is more advantageously carried out in the evening, before the patient goes to sleep. The child is placed on a hard couch or mattress with head and thorax raised and legs sharply flexed at the knee joint and somewhat rotated outward. The attendant stands on the left side of the patient. The manipulations are begun at the fossa iliaca sinistra,* where the sigmoid flexure is situated and is frequently found to be a halting place for hardened feces. With the tips of the fingers of one hand (in older children both hands may be used, one hand being placed upon the other) the attendant makes gentle circular movements along this portion of the colon and at the same time exerts upon it considerable pressure downwards towards the rectum. Without changing these movements the attendant slowly ascends as far as the splenic flexure. From here he gradually returns to the sigmoid. He now begins a new tour going as far as the hepatic flexure, and after gradually returning to the starting point he makes his final trip reaching the cecum and, in the manner just outlined, returns again to the fossa iliaca sinistra. These manipulations should be followed by rhythmical vibratory strokes over the entire abdomen, interrupted by a few pressure movements against the spinal column in the epigastric region. The treatment should last from six to twelve minutes.

Instead of trying the massage, oil enemas, and hydrotherapy separately, it is certainly preferable to employ these three procedures—the *anticostive triad*—simultaneously, as they do not interfere with one another, but, on the contrary, are destined to supplement one another in their beneficial effect. Thus, after completing the massage the little patient is turned upon his left side, and by means of a piston syringe a half an ounce or more of oil is gently injected into the rectum and allowed to remain there. This is followed by the application around the abdomen of a Priessnitz compress, which should be left in place until the next

* Most authors recommend to begin the massage over the cecum, but I fully agree with the following drastic remarks of Thure Brandt (Dr. E. Ekgren's manual on massage): "In attempting to express the contents of a long sausage it will prove quite difficult to do so by beginning to push the entire contents from the proximal to the distal end; on the other hand, if begun with the distal, open end, the sausage can be emptied piecemeal without any difficulty whatever." The same reasoning figuratively applies to the intestines.

morning. It will almost invariably be found that the patient's bowels will act either during, or soon after the treatment or, at any rate, not later than the following morning. A three or four weeks' course of treatment will usually suffice to establish regularity of the bowels provided the preventive measures suggested before are strictly adhered to. In some, very protracted, cases of constipation these procedures may be supplemented by the application of the galvanic or faradic current. One electrode is passed successively over different portions of the abdominal wall, and the other electrode is placed upon any other part of the body.

Proctologists frequently advocate divulsion of the sphincter ani as a sure cure of habitual constipation. I am not inclined to be quite as enthusiastic over it, except in cases of constipation due to rectal disease, as, for example, fissura ani, rectospasmus, etc.

Finally, there is a class of cases of chronic constipation which resists all forms of treatment as regards a permanent cure, but may be considerably improved by alternately resorting to the therapeutic measures already enumerated as well as to drugs. In the selection of an evacuant the physician must be guided by the etiological factors and the individual peculiarities of the case in question. The indiscriminate use of antispasmodics as well as the ever ready, "soothing" laxatives is to be strongly deprecated. "That only is a good purgative which will produce without discomfort (colic, tenesmus, nausea), a soft, not a watery, abundant evacuation." Effective and comparatively harmless are the following remedies: Soap and glycerin suppositories, medicated cocoa butter suppositories (with aloin and belladonna in spastic, or nux vomica in atonic, constipation), enemas with small quantities of glycerin or larger quantities of soap-water; internally magnesia usta, magnesia and rhubarb, compound licorice powder, castor-oil, extract of cascara sagrada, calomel followed by a mild saline aperient, and, in older children, the standard mineral salts or waters. Of the more recently recommended cathartics I found exodin (diacetyl-rufigallic-acid-tetramethyl-ether) to act splendidly. It is tasteless and, therefore, readily taken by the little patients either in apple sauce, syrup of acacia or in tablet form. In from three to ten grains it produces a soft movement without any gastrointestinal disturbance.

Whatever the method of treatment employed, the establishment of a habit of regular stools should at all times be our chief aim.

MYOTONIA CONGENITA, OR THOMSEN'S DISEASE; A CASE.*

BY FRANK S. MEARA, M.D.,

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In his treatise on Organic Nervous Diseases, Starr, writing in 1903, says of Thomsen's Disease: "As but 30 cases have been recorded in literature up to the present time, the affection may be considered rather a curiosity."

The case here cited, which has just come under my observation, fits so precisely into Thomsen's classical description that I deem it worthy to be added to the published list.

The father brought the patient, a boy of ten, to me on September 5th of this year to obtain an opinion as to the cause of a peculiar stiffness of the muscles, regarding which he had been merely told that probably the child would outgrow the affection.

Patient X. Y., age ten years. American. Family circumstances good. Family history: On neither side, to the knowledge of the father and mother, has there been a similar condition, nor is there a history of any nervous disease. On both sides the family has been long-lived.

Past history: Patient was the third of a family of five children, all living, healthy and well developed. The labor was normal, non-instrumental. He was breast-fed. In infancy he had an umbilical and right inguinal hernia, both of which disappeared without operation. At twenty-one months had an attack of measles. A week after the disappearance of the eruption he had a pneumonia on one side, the temperature disappearing by lysis, and immediately following this an involvement of the other side, running a temperature for eight days and disappearing by crisis. About three years ago he had diphtheria. As compared with the other children the father considered him as delicate, though suffering from no nutritional disorder. He was always somewhat white.

He was late in walking, and it was not until he was two years old that the present trouble was noticed, and then perceived as a stiffness of the muscles of the legs, causing an impediment in gait. During this summer, too, at times it was noticed that the

* Read before the Section on Pediatrics, the New York Academy of Medicine, October 12, 1905.

whole body appeared to be "rigid," but at no time was this rigidity convulsive. This last statement the parent reiterated emphatically. From three to six years (a period representing the education of co-ordination) his condition was worse than since.

The father described the condition as a stiffness involving all the muscles of the body and coming on at the beginning of an effort of any kind; for example, when he starts to walk or run, the legs appear stiffened and the boy starts off on tip-toe, swinging the legs around as one piece. The more sudden and violent the effort, the greater the difficulty.

When playing baseball, if he hits the ball and starts for the base, he becomes rigid and has great difficulty in starting.

After a few steps, or after muscular effort of any kind, this rigidity disappears and the muscles become supple; when, however, he rests, a renewed effort is accompanied by the same stiffness, which will again disappear if the exercise is persisted in, and so on. The stiffness is more marked when the boy is tired, when the weather is damp, when he is cold, and during a heated spell in summer, though he is better in warm, mild weather.

There has never been any impediment of speech and no mental impairment. The boy stands well at school.

He is very good-natured, though of an emotional temperament and sensitive. His appetite is good; bowels regular. He has never had any disturbance of bladder or rectum.

Examination.—The boy, dressed, strikes one as well developed for his age and of somewhat stocky appearance. His weight with his clothes on is 69 pounds and height 53 inches. The expression of the face is a trifle mask-like or wooden. He inclines his head a little to the right, the chin being pointed perhaps a little to the left of the median line. He is unable to wrinkle his brow, either to simulate surprise or to produce a frown. The eyes show a little convergent strabismus. The father says that before the glasses were prescribed (a year ago) he was accustomed to carry his head down, with the eyes turned downwards and when he wished to look up he would lift his head and then the whites of the eyes could be seen. The mother adds that he had a decided squint when younger. The eye symptoms have been ameliorated by the glasses, but the movements of the body at large have not. This eye condition could readily be attributed to the stiffness of the ocular muscles.

The expression about the mouth is stiff, the lips protruding slightly, faintly recalling the "tapir mouth" of the Landouzy-Dejerine type of muscular dystrophy. The smile is somewhat slow and does not seem to develop fully; the boy himself says that when he smiles the face seems stiff.

Protrusion and retraction of the tongue shows the same difficulty of the initial movements as is displayed in the other muscles, the tongue protruding only a part of the way and curling up with the effort; retraction being equally slow; but after a few efforts the act is readily accomplished. The tongue is rather white, flabby and broad.

His speech is a little muffled, but he enunciates as well as many boys of his age. This muffling seems to be due to the stiffness of the muscles of the lips, although the tongue may share in it. It is not striking nor is there any difficulty in starting the speech nor any approximation to stuttering. There is no impediment to mastication.

The head nods laterally at frequent intervals, but not rhythmically. It is suggestive of a habit spasm. The circumference of the head is 20 1-16 inches.

When stripped the first thing that strikes the observer is the splendid muscular development. The boy looks like a trained athlete, yet he has had no systematic exercise, though he plays with the other children in their ordinary games. His father and mother are of rather slight build, as are the other children of the family.

The neck is remarkably thick, the masses of the trapezius standing out prominently. The measurement taken at the collar line is 12 inches.

The thyroid gland is easily palpable and appears to be normal.

The arms are extraordinarily muscular, the deltoid, biceps, and especially the triceps, standing out prominently.

The muscles of the forearm are hard and show their contour under the skin. The grip is strong and even.

When asked to flex and extend the elbow, the initial efforts are made with difficulty and incompleteness, while the muscles are rigid with the strain of the effort. When urged to hurry, it is still more difficult. It takes four or five efforts to extend the arm completely, but gradually the movements become more rapid, more supple and more complete. The same phenomenon is shown

when the child is asked to flex and extend the fingers; here the initial effort is decidedly difficult and incomplete, but is effected after repeated efforts.

The muscles of the back, especially when in action, stand out in masses; the supraspinati and infraspinati being very well marked. The shoulder blades stand out a trifle, possibly not more than normal. The rhomboids are well developed. The erector spinæ stand out as marked columns on either side of the spine. The pectorals are not as large, but are scarcely wasted; in fact, no muscle of the body is wasted. The abdominal muscles are strong, the glutei, the muscles of the thigh anterior and posterior are large and hard. On the outer aspect of the thigh when the muscles are contracted the fascia is held as rigid as a board. The muscles of the calf are likewise massive.

The peculiarities of gait as described by the father were readily observed. When the boy met a slight incline the constraint of the gait became noticeable at once.

When the boy stepped from the floor to a chair and from the chair to a table and then started to walk on the table, the stiffness was so marked that he stood right on tip-toes. A repetition of the effort was more readily accomplished. In fact, every new effort by any muscle whatsoever brought out the same series of events. It was hard to demonstrate the implication of the respiratory muscles and the diaphragm, as these muscles are in continuous action. The father was asked if he got short of breath easily on vigorous exercise. He said that he had not noticed it, but reported on a subsequent visit that he had noticed this since his attention was called to it, but information so elicited must be taken with reservation.

I was told that I was seeing him at his best at present and that at times when he started suddenly he became rigid all over.

The heart was normal, the lungs negative. Both knee jerks are lively, though scarcely exaggerated. There was no wrist or elbow jerk and no ankle clonus.

The skin and mucous membranes are rather pale. There is no disturbance of sensation.

Results of Electrical Tests.—These reactions were studied on the patient and two normal individuals as controls.

To faradism the response occurred to a much less current than in the controls, and instead of being a sudden jerky contraction, was a continuous tetanic contraction.

The muscles were easily excited by the galvanic current; as much response being obtained to 10 milliamperes as to 20 in the controls.

The cathodal closing contracture was marked; the cathodal opening contracture negative; the anodal closing contracture was marked, but not as much, I think, as the cathodal.

The response to the closure of the current was slower than in the controls, but still fairly prompt. On stroking the muscles with the current closed at the cathode (stable galvanic) a prolonged vermicular contraction was observed. This was very distinct; the light and shadow of the slowly contracting muscle being clearly visible to both observers. Moreover, this slow contracture would continue after the pole was removed.

Some of the contracture could be obtained when the current was closed at the anode, but not as distinct.

No trace of this phenomenon could be obtained in either control. A sharp blow upon the muscles by the examiner's fingers was responded to by vermicular contraction. This was beautifully shown when the extensor group of the forearm was struck high up; the movement like a slowly rolling wave passing down the arm.

This case, then, meets all the criteria of Thomsen's Disease. A congenital affection of the muscles, characterized by a stiffness accompanying the initiation of every muscular movement, which passes off on continuance of the effort and a peculiar change in the muscles in response to electrical or mechanical excitation.*

400 West End Avenue.

Diphtheria Antitoxin as a Prophylactic Measure.—Ibrahim's extensive experiences at the children's clinic at Heidelberg speak convincingly in favor of the great value of protecting injections of diphtheria antitoxin. It confers immunity to diphtheria for three weeks at least, without fail; 250 to 300 immune units is the effectual dose. Children already having scarlet fever, whooping cough, and especially measles, should be given 500 units. The same dosage applies also to infants. In the contagious ward the injections should be repeated every four or, better still, every third week, and in case of measles, every second week.—*Journal of the American Medical Association.*

* The discussion of this paper will be found on page 859 of this number of ARCHIVES OF PEDIATRICS.

THE ETIOLOGY OF NOMA.*

BY CHARLES HERRMAN, M.D.,
New York.

If a platinum loop be introduced between the tooth and the slightly inflamed gum in a mild case of gingivitis, and the specimen thus obtained be spread, fixed and stained with diluted carbol fuchsin, the microscopical examination will show (see Fig. I.) in abundance what are *apparently* two microorganisms; one described by Miller¹ as the spirillum sputigenum, a comma-shaped

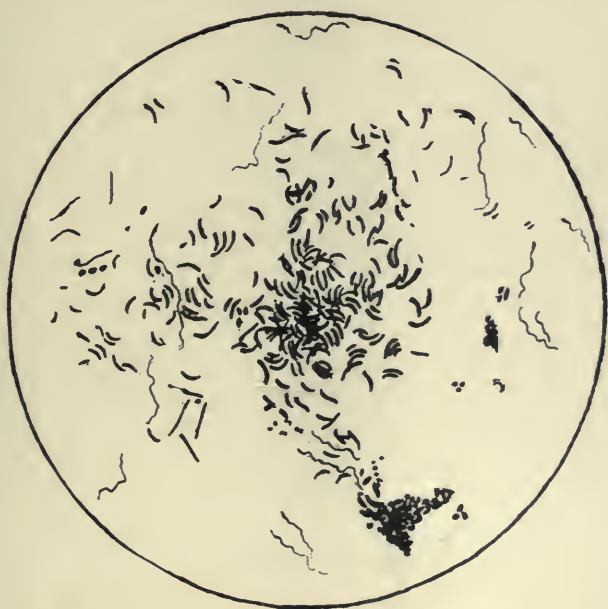


FIG. I.—SPIRILLUM SPUTIGENUM AND SPIROCHÆTE DENTIUM,
FROM THE MOUTH, 1000:1.

organism, similar in form and size to the cholera-vibrio; having a rapid screw-like motion. It cannot be cultivated on any of the usual culture media.

The examination of a number of specimens taken from different patients will show, in addition, great variation in size and shape, from the comma-like forms to curved rods pointed at the

* Read before the Section on Pediatrics, the New York Academy of Medicine, October 12, 1905.

ends, and straight needle-like structures. The intensity of staining is greatest in the first forms, least in the last. Often the organisms will be found arranged in nests thickly intertwined, with a tendency to radiate from the centre, and thinning out toward the periphery into finer filaments.

Stained by Löffler's method for flagella, good specimens are difficult to obtain, partly on account of the admixture with other material. Exposure to the air causes rapid disappearance of the flagella. However, if the specimen be carefully prepared some parts will show that the organism has a membrane and is flagellated.

The second organism described by Miller as the spirochaetentium (denticola) is a fine wavy corkscrew-like structure of varying length and thickness. The ends are pointed. It stains very much less distinctly than the spirillum sputigenum. It has a very rapid serpentine motion and cannot be cultivated on the usual culture media.

Although the two organisms just described are apparently distinct, I believe that they represent different parts or different stages of development of the same organism.

Although these two forms of the organism are found normally in the mouth in small number, certain conditions favor their growth and development. Of these, the most important are produced by slight changes in the teeth which cause hyperemia of the gums, which in its turn may go on to the production of a gingivitis. The organism is found most abundantly where such changes are most frequently met with, where the food is least likely to be removed during mastication, namely, at the junction of the gum with the lower incisor teeth, still oftener around the molars, and somewhat more frequently on the left side of the mouth. In infants who have no teeth this organism is not found.

In 1894 Plaut² reported 5 cases of angina in which spirilla and spirochaetæ were found in large numbers.

In 1896, in an article on Hospital Gangrene, Vincent⁴ mentions having found the so-called "fusiform bacillus" in certain forms of angina.

To Bernheim* and Pospischill⁵ belong the credit of having

* Bernheim demonstrated his specimens in June, 1897, and the first report appeared in the *Centralb. f. Bakt.*, of February 11, 1898.

Vincent specimens were demonstrated, and the report appeared in March, 1898. The organisms were mentioned by other observers before this time.

been the first to accurately describe the clinical, bacteriological and histological findings in ulceromembranous angina, and to point out the relation of this form to the cases of ulcerative stomatitis. About the same time Vincent⁴ published similar findings, namely, the uniform presence of the "fusiform bacillus" and spirochæte in a certain set of ulceromembranous lesions of the mouth. The same organisms were afterwards found by a number of other observers.

It is unfortunate that this organism has been called the fusi-

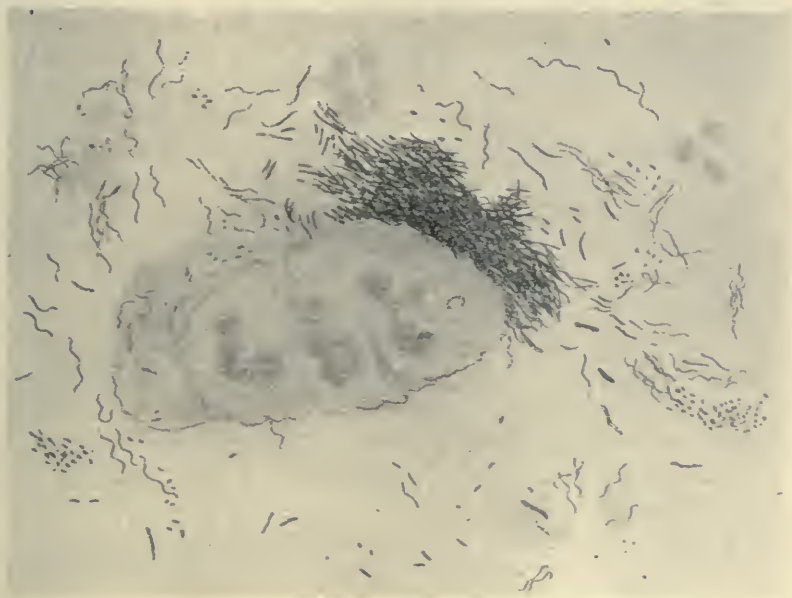


FIG. II.—FUSIFORM BACILLI SHOWING THE ARRANGEMENT IN NEST-LIKE MASSES: SPIROCHÆTE. FROM A CASE OF PYORRHEA ALVEOLARIS.

form "bacillus," for neither morphologically nor biologically does it belong to that group. In form it represents a segment of a spiral. It has a membrane and it is flagellated. This organism in its most common form, as seen *after staining* (Fig. II.), is about twice as long as the Klebs-Löffler bacillus, and pointed at the ends. Some forms are straight; others curved. Occasionally, two are joined end to end, with their convexity in the same or in opposite directions. In specimens taken from different patients there will be noted a variation in size, depth of staining, and rela-

tive number as compared with the spirochæte. In some parts of the specimen nest-like masses will be seen (Fig. II.), densely interwoven at the centre and thinning out at the periphery.

The spirochæte is a long corkscrew-like structure with pointed ends and variable in size and intensity of staining. Both forms are best stained by a diluted solution of carbol fuchsin. Sometimes the rods, less frequently the spirochætæ, are not stained uniformly along their entire length. (Compare with Fig. V.)

These do not, I believe, represent involution or degenerated forms, but a stage in the further development of the organism, notwithstanding the fact that staining for spores according to the usual method gives a negative result. The spirochætæ are rapidly decolorized by Gram, the rods more slowly. The difference of opinion on this point is due to the fact that the observers failed to recognize that they were dealing with different stages of development of the same organism.

Both forms are motile. As seen in the hanging drop (saliva from the patient's mouth) the spirochæte has a more rapid serpentine movement, the rods a less rapid undulating movement.

The difference of opinion as to the motility of the rod-like forms is due to the fact that the organism was observed under different conditions. Its motility is rapidly lost on exposure to the air. It is very sensitive to changes of temperature. The fluid medium in which it is suspended must be of the proper composition. In a drop of the patient's saliva it is distinctly motile if examined immediately.

There is another very important peculiarity to which Letulle first drew attention. In the hanging drop the rods are curved. If the specimen is allowed to dry in the air and then stained, the rods are straighter. A similar change takes place in the spirochætæ. In the stained specimen they are drawn out so that the undulations are much shallower. The degree of curvature would therefore seem to depend on the vitality of the organism. It also appears much finer after desiccation. The rods also appear thicker in the hanging drop. This, I believe, is due to the presence of an enveloping membrane, which is distinctly visible when specimens are stained by Löffler's method for flagella. The organisms are found most abundantly in the deeper parts beneath the necrotic layer. They do not thrive in superficial parts where they are mixed with many other micro-organisms.

In 1901 Sobel and myself published⁵ a "Report of 12 cases

of ulceromembranous angina associated with the 'fusiform bacillus.'** From that paper, I abstract the following:

"Notwithstanding the differences in size and shape, it is highly probable that the '*fusiform bacillus*' and the *spirillum sputigenum* are identical.

"Observations of transitional forms which we have made in our series of cases would seem to indicate that there is a genetic connection between the 'fusiform bacillus' and the spirochæte.

"Until all three conditions, as laid down by Koch—constant presence, pure cultures and experimental inoculation—are fulfilled, it cannot be stated with absolute certainty that the 'fusiform bacillus' stands in a direct causative relation to this form of ulceromembranous angina. The following points, however, make its specific character highly probable:

"1. Their uniform presence in very large numbers, or in nearly pure culture.

"2. Their gradual disappearance during the process of healing.

"3. The presence of so few other microorganisms"—and I should now add:

4. The fact that the organism is found penetrating into the apparently healthy tissue beneath the necrotic layer.†

BACTERIOLOGY OF NOMA.—The clinical features of noma have always favored the view that it was a specific gangrenous process of microbic origin. For some time investigators directed their entire attention to the finding of the specific coccus or bacillus which caused this affection, but there was no uniformity in their results. Several observers noted the presence of thread-like or-

* The first cases of this affection reported in this country, were published by Sobel and Herrman, *New York Medical Journal*, December 7, 1901, and by Mayer, *American Journal of the Medical Sciences*, February, 1902.

† Many of the cases of ulceromembranous angina are still diagnosed as diphtheria. As the organism disappears very rapidly from the swab, it cannot be found after several hours. This difficulty may be overcome by making a smear with the swab on a glass slide immediately, and sending this with the culture tube for examination.

We should expect that a few diphtheria bacilli would occasionally be found in the ulcerative and gangrenous lesions of the mouth or other parts. When a genuine pseudomembrane is present and the administration of antitoxin has a specific action, the case may be regarded as one of simultaneous but independent infection. The toxins of diphtheria cause changes in the tissues which render the penetration of the spirochætæ possible.

ganisms, but did not lay much stress on their importance. However, as early as 1883 Lingard⁷ appears to have recognized their etiological significance.

The first investigators who drew especial attention to these thread-like microorganisms were Seiffert⁹ and Perthes¹⁰. The latter, with praiseworthy disinterestedness, states that Seiffert in 1897 reported his findings at a meeting of the Leipziger Medicinische Gesellschaft. A short abstract was published in the transactions of that body, where it lies virtually buried. Perthes' conclusions are:

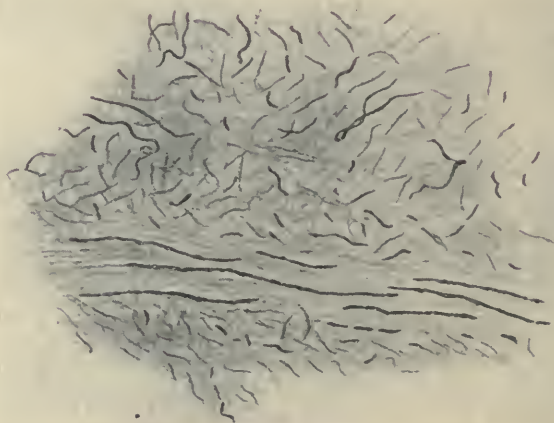


FIG. III.—(AFTER PERTHES.) NOMA. A PORTION OF THE NECROTIC TISSUE STAINED WITH CARBOL FUCHSIN, SHOWING A NETWORK OF FINE THREADS; ALSO THICKER THREADS, SOME SEPARATED INTO BACILLI-LIKE SEGMENTS, OTHERS LONGER WITH NUMEROUS CURVES.

"Noma is a mycosis which develops on the basis of an especially acquired predisposition. The predisposition is caused by the infectious diseases (measles, typhoid), especially in children, and also by other conditions which lower the vitality. It is caused by a microorganism which, in its botanical relation, stands between the bacteria and the thread-like parasites. This organism should be grouped as a streptothrix, a class of which the actinomyces is the best known representative.

"In the diseased tissue the streptothrix of noma forms threads which are often of a remarkable length and number. From these threads finer filaments are given off, often dichotomously, which by their union and intertwining form a mycelium which is of such a density at the boundary between the normal and necrotic tissue that it may almost be said that the tissue is replaced by a network of threads. The projecting filaments have a spirillum form. They push forward into the normal tissue, surround the cells and cause their death. (Figs. III. and IV.) . . .

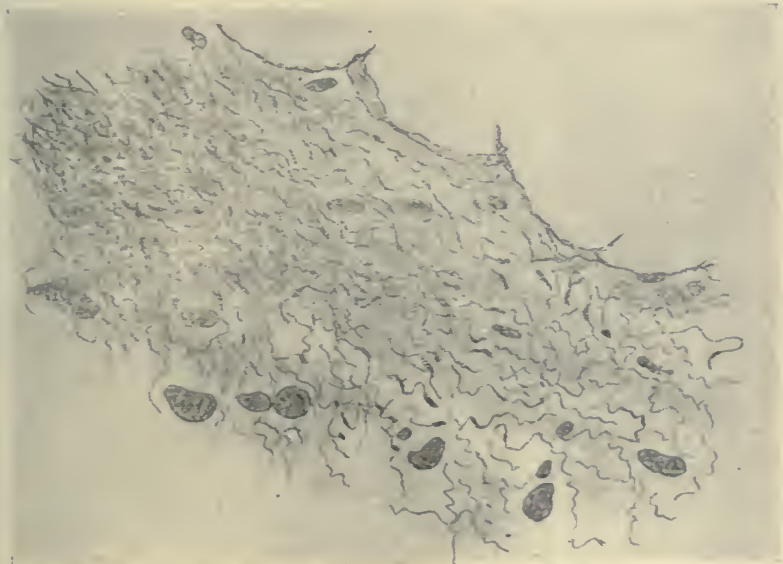


FIG. IV.—(AFTER PERTHES.) NOMA. SECTION AT THE BOUNDARY LINE BETWEEN HEALTHY AND NECROTIC TISSUE, SHOWING THE FINE SPIRILLA-LIKE, WAVY THREADS: ON THE LEFT TOWARD THE NECROTIC TISSUE IN THICK MASSES, ON THE RIGHT TOWARD LIVING TISSUE MORE ISOLATED. SOME THREADS SHOW A SPINDLE AT THE END OR IN THEIR COURSE. (COMPARE FIG. VI.)

"1. The mycelium is present in such density at the boundary line, the threads penetrate so deeply into the healthy tissue that one gets the impression that it is the principal factor in the destruction of the cells. The microscopical picture explains the production of necrosis.

"2. The finest filaments are seen to penetrate deeply into the

healthy tissue even before the main body of the mycelium has arrived. These cannot be mere harmless saprophytes. The germs of putrefaction are not found between otherwise unchanged cells.

"3. If this mycelium was really a harmless putrefactive parasite we ought to find it most abundantly in the old gangrenous areas. That, however, is not the case. The finest mycelia are seen principally on the boundary line. On the other hand, in the parts which have been necrotic for some time, only the older, thicker threads are seen, and in small number."



FIG. V.—(AFTER PERTHES.) NOMA. FROM A SPECIMEN STAINED BY WEIGERT'S METHOD. SOME PARTS OF THE THREADS STAIN DEEPLY, OTHER PARTS ONLY SLIGHTLY, OR JUST VISIBLE. THE FINER THREADS ARE NOT VISIBLE.

Perthes considers the different forms, different stages of development of the same organism.

Following Seiffert and Perthes, other observers reported the presence of the same organism in noma. Schmidt¹¹ found at the boundary between normal and necrotic tissue short fine bacilli and long wavy threads,

which could not be cultivated. After a portion of the necrotic tissue had been implanted into a rabbit, postmortem examination showed only *bacilli*, no *threads*. He also noted the rapid disappearance of the organism from the culture media, and advised anaerobic culture methods.

Comba.¹² Noma is always secondary to an ulcerative stomatitis. The death of tissue is not due to a primary disease (embolism) of the blood-vessels. The process begins from without, affecting the tunica cateona first. The gangrene is caused by the

saprophytes of the mouth which in symbiosis become pathogenic under favorable conditions.

Krahn¹³ found at the boundary line comma bacilli which form spirilla. Cultures were nonpathogenic for animals. On ordinary culture media he obtained only a growth of staphylo and streptococci. An absence of the ordinary flora found in gangrenous processes was noted. Krahn does not accept the theory of Perthes that all the forms observed represent different stages of development of the same organism, but is inclined to believe they bear some relation to the spirillum sputigenum and spirochæte dentium.

Blumer and MacFarlane¹⁵ found spirilla-like organisms of varying size, staining fairly well with carbol fuchsin, and not decolorized by Gram. Histological examination of specimens showed a thick mass of filaments at the boundary line. The organism could not be cultivated.

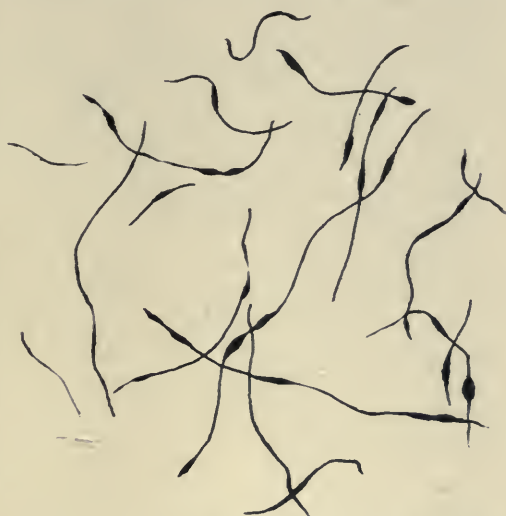


FIG. VI.—(AFTER PERTHES.) NOMA. FROM A COLONY ON AGAR FINELY DIVIDED AND EXAMINED IN LUGOL'S SOLUTION. THE THREADS SHOW A SPINDLE-LIKE THICKENING.

Matzenauer.¹⁶ The same pathological changes which are found in noma of the mouth may be found in noma of other parts of the body. It is very slightly contagious, infection taking place only under exceptionally favorable conditions. It is a gangrene without the production of gas, similar to hospital gangrene, and analogous to it in its clinical and pathological features. In both the inflammation of the tissue soon leads to coagulation necrosis.

In connection with these views it is interesting to note that as early as 1839 Taupin, as quoted by Kraus,⁶ expressed the opinion that ulcerative and gangrenous stomatitis were essentially

the same in their nature, and compared them to hospital gangrene.

In 1896 Vincent,⁴ in his article on "Hospital Gangrene," mentions the fact that the "fusiform bacillus" which he found in this affection was also found in a certain set of cases of ulceromembranous angina.

CLASSIFICATION OF THE ORGANISM.—At the present time it is difficult to determine to what family this organism belongs. Seiffert called it a cladothrix; Perthes a streptothrix. In the classification of Migula,²¹ these two genera are placed under the family of the chlamydo bacteriaceae, which are defined as branching or unbranching threads, having a rigid sheath. Different forms represent different stages of development.

The *cladothrix* is characterized by the formation of pseudodichotomous branching threads. Division in one direction only. Propagation by means of polar flagellated swarm spores. Vegetative increase by the separation of entire branches. The *streptothrix* is characterized by the formation of unbranching threads. Division in one direction only. Propagation by means of immotile conidia. The family of the *spirillaceae* is characterized by the formation of cells twisted into a spiral or a segment of a spiral. Division takes place in one direction following a prolongation of the cell. Under this family are placed the *spirochætæ*, flexible, serpentine organisms, which probably move by means of an undulating membrane. It has not been definitely determined whether they have flagella also.

I believe the organism with which we are dealing belongs to this last group, which has such unusual characteristics that it would seem better to consider it a separate family.

According to Schaudinn,²² it is often a matter of individual opinion whether a given organism should be classed as a trypanosome or a spirochæte. The distinction is made that the former become fixed by means of their polar flagella, the latter by their unflagellated ends.

I believe that the organism found normally in small numbers in the mouth, and in great numbers in gingivitis, in ulcerative and gangrenous stomatitis, as well as in noma of other parts of the body, belongs to the family of the spirochætæ, a family which serves as the connecting link between the bacteria and the lowest forms of animal life, the protozoon. For this organism I should suggest the name spirochæte necroscos or spirochæte of necrosis.

A more detailed description of this organism will be published later.

The term noma is here used to indicate a specific necrotic process which may occur in any part of the body.

After Schmidt had suggested anaerobic cultural methods, Seiffert succeeded in obtaining cultures of the so-called "streptothrix" on bouillon and on agar. Inoculation into guinea-pigs resulted in suppuration, followed by gangrene. In rabbits suppuration only.

Perthes, although he used the utmost care in obtaining the material from the deeper parts of the diseased tissue, never found it possible to obtain pure, uncontaminated cultures by any method. There were always some cocci clinging to the threads.* On inoculating animals Perthes could never obtain a progressive gangrene. The "mycelium" of fine threads was never seen. In animals, as in human beings, the necessary predisposing conditions are not present, and they are not easily produced artificially.†

PATHOLOGY.—In the brief report published by Lingard⁷ in 1888, the histological changes in noma are very well described.‡

The most careful recent studies of the pathological changes in noma have been made by Perthes,¹⁰ Ranke¹⁴ and Brüning.¹⁷ Ranke, paying especial attention to the changes in the cells; Brüning to the relation of the "streptothrix" to the muscular fibres and to the blood-vessels.

Brüning says: "In the course of the muscular fibres the threads are seen running in different directions, and penetrating the tissues. Some of the organisms are in the form of simple rods, some are whip-like, some spirillum-like. In the interspaces of the muscular fibrillæ, bundles of radiating filaments (sheaf-like) are seen. (Fig. VII.) The blood-vessels are affected from without. First, the adventitia, then the media, and in some places

* It may be asked whether these were really cocci, or whether they may not possibly represent a stage in the further development of this organism.

† In a recent communication Róna has suggested that the animals be given mercury in order to render them more susceptible to a successful inoculation.

‡ At the end of the report, the author promises to publish a detailed account with drawings. I have not been able to find it, and have not seen any references to it in the literature. If it exists, it will probably prove to be a very interesting contribution to the subject.

the filaments, pass through interspaces in the intima into the lumen of the blood-vessel. The filaments surround the elements of the blood-vessels, penetrate centrally and cause their destruction." (Fig. VIII.)

Ranke says: "The histological examination of a section gives the impression that the bacilli penetrates the tissues and by the

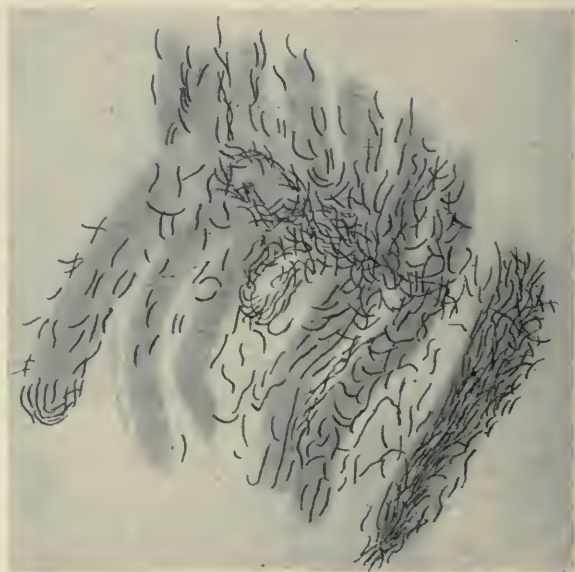


FIG. VII.—(AFTER BRUNING.) NOMA. NOMA THREADS WITHIN THE MUSCLE FIBRES: FROM A SECTION OF NECROTIC TISSUE. (THE MAGNIFICATION IN FIG. VII AND FIG. VIII ARE THE SAME, SO THAT THE DIFFERENCE IN THE SIZE OF THE ORGANISM IS NOTEWORTHY. C. H.)

production of toxic substances, cause a destruction of tissue '*en masse.*'"

In the sections shown by Brüning (Figs. VII. and VIII.) the finer filaments are not seen on account of insufficient depth of staining.

The clinical, bacteriological and histological features strongly favor the view that ulcerative stomatitis and gangrenous stomatitis (noma) are essentially identical in their nature, the one representing a more advanced stage of the other. In support of this view, the following points may be cited:

Bohn, Henoch, Guizetti, Comba, Seiffert and others, have noted the transition from ulcerative to gangrenous stomatitis.

In both conditions at the beginning the process is purely a local one, with very slight constitutional disturbances, comparatively little pain, fever, etc. (In noma death is caused by a toxemia due to secondary infection with the microorganisms, which cause septicemia.) In both the process begins unilaterally.

In some cases it may be difficult to decide whether a given

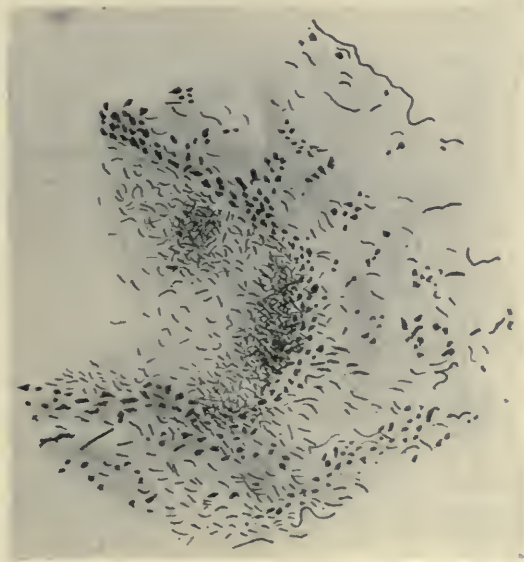


FIG. VIII.—(AFTER BRUNING.) NOMA. NOMA THREADS PENETRATING THE WALL OF A VEIN AND ENTERING THE LUMEN OF THE VESSEL.

case is one of severe ulcerative or mild gangrenous stomatitis. Holt and others have observed superficial necrosis of the jaw in ulcerative stomatitis.

Henoch considers that the important differential feature is the fact that in noma the soft parts, the cheek, lips, etc., undergo gangrenous destruction with a resulting deformity. After all, this is simply a difference in the intensity of the process.

MORPHOLOGICALLY, the organism found in both of these conditions is essentially the same. They have in common:

The same variation in form and size.

The association of rods and wavy filaments.

The arrangement in nests and radiating filaments.

In both the rods stain best with carbol fuchsin, and the finer filaments take the stain with difficulty. In both the rods often show interrupted staining (Fig. V.), and are slowly decolorized by Gram's method. In both we find the spindle-like thickening. (Figs. IV. and VI.) Both have in common:

The rapid disappearance from the ordinary culture media. Difficulty in obtaining growth and pure cultures on the usual culture media. Difficulty in obtaining positive results by inoculation in animals.

Histologically, we see the same tendency to penetrate the normal tissue at the boundary line between the healthy and necrotic areas.

That the teeth play an important part in the production of ulcerative and gangrenous stomatitis is shown by the following facts:

1. These processes are not met with where there are no teeth, namely, in infants and in old age.
2. The primary lesion is a gingivitis. The cheek, tongue, tonsils and other parts are always affected secondarily.
3. According to Kraus,⁶ in cases of ulcerative stomatitis, if a fine probe be introduced between the swollen inflamed gum and the tooth, the smallest, freshest ulcerations will be seen on the inner surface of the gum. From this point they spread to the edge and external surface.
4. In infants, in whom there are only two incisor teeth, the process begins adjacent to and opposite these teeth.
5. The greater frequency of ulcerative stomatitis at the time of the first and second dentition, which are often accompanied by hyperemia of the gums.
6. The organism associated with these processes is not found in lesions of the mouth of infants who have as yet no teeth.
7. The ulceration heals quickly when the offending tooth is removed.*

* It is interesting to note that Israël and Partsch believe that the presence of carious teeth plays an important part in the etiology of actinomycosis, by furnishing a medium favorable for the growth and multiplication of the organism which may then penetrate the gum.

Boström believes that the organism which they observed in carious teeth was not the actinomycosis, but a leptothrix. In support of the views of Israël and Partsch, it may be mentioned that actinomycosis is met with in calves, especially at the time of dentition, when the gums are hyperemic, easily injured and not so closely attached to the neck of the tooth. (See Korányi, "Actinomycosis," in Nothnagel's Spec. Path. u. Therap.)

The examination of an apparently healthy mouth will show occasionally a cast of the molar teeth on the buccal mucous membrane, a horizontal ridge separating the impressions of the upper and lower teeth and vertical ridges corresponding to the spaces between the teeth. If to this is added a catarrhal condition of the mucous membrane, with some swelling, the cast becomes more distinct. A similar cast may sometimes be observed on the edge of the tongue.

If there is a diseased tooth or one with a sharp, rough edge pressing against the mucous membrane, the latter becomes opaque, opalescent at the point of contact, then macerates and becomes detached. The process seldom goes further. Occasionally, however, the gingivitis adjacent to the affected tooth produces conditions favorable for the growth and development of the spirochaete. By its pressure and irritation the tooth causes a break in the continuity of the mucous membrane through which these organisms then find entrance into the tissue. Once there, they require unusual and exceptionally favorable conditions in order that they may be able to penetrate more deeply and cause ulceration and necrosis; the space between the gum and diseased tooth serving as a source of supply of fresh organisms.

In order that the process should go on to the production of gangrene, it is *absolutely essential that the tissue should have previously undergone a physiological change*, which makes it possible for the organism to penetrate and thrive in the apparently healthy tissue. This physiological change is found most frequently following the infectious diseases of childhood. More cases of noma have been observed after measles, probably because this disease being extremely common its complications are more frequently met with, and also because a catarrhal condition of the mucous membranes of the mouth is a regular accompaniment of the disease.

Similar physiological changes are probably present in diabetes, leukemia, scurvy, mercurial and possibly some other forms of poisoning. It has been objected that noma cannot be caused by the ordinary mouth organisms, because the same process is sometimes extrabuccal. An organism which is regularly found in small number in the mouth is not, therefore, strictly and solely a mouth organism. Very likely the microorganism with which we are dealing exists in a very resistant form ("Dauersporen") in the air

and develops more frequently in the mouth because it finds there the necessary conditions.*

This organism has also been found in very many and very different parts of the body. In cases in which noma of other parts is secondary to the lesion in the mouth, the contagious material may have been carried by the fingers. However, this method of contagion is probably not the only one.

The extreme rarity of hospital gangrene (which may be considered a form of noma) at the present time, is to be explained by the fact that external wounds are uniformly covered by a protective surgical dressing. On similar lesions of the mucous membrane this is impossible. Hospital gangrene is still a fairly common disease in those Eastern countries in which modern aseptic methods have not been introduced. Gangrenous processes similar to noma have been observed in a number of animals. In 1884 Löffler described the bacillus of "Kälberdiphtherie."

It is interesting to note that at a meeting of the Greifswalder Medicinische Verein, in 1890, at which Grawitz showed the histological specimens from a case of noma, Löffler called attention to the similarity of the histological picture to that which he had observed in "Kälberdiphtherie."

In 1888 Lingard described the occurrence of what appeared to him the same disease, namely, ulcerative and gangrenous stomatitis, in the human being, monkeys and calves.

In 1890 Bang described an anaerobic bacillus which he found in a necrotic process observed in oxen.

In 1890 Schmorl¹⁰ described the streptothrix cuniculi, an anaerobic organism, staining fairly well with carbol fuchsin, growing on blood serum, and found in a necrotic process observed in rabbits.

In 1897 Jensen,²⁰ of Copenhagen, reviewed these findings and came to the conclusion that the bacillus necrophorus (Flügge), the bacillus diphtheriæ vibulorum (Löffler), the bacillus necroseos (Salomonsen), and the streptothrix cuniculi (Schmorl) were all

* Among the favorable conditions which are present in the mouth, there may be mentioned: The relatively high temperature, the moisture and the presence of saliva; in some conditions a slightly acid reaction; the anaerobic conditions in the spaces between the teeth and the gum, in *carious teeth* and in the *deep crypts of the tonsil*, nutriment for the organism from the dentine and the dental pulp, as well as from the *food which remains in the cavities and spaces between the teeth.*

one and the same organism which he called the bacillus necroseos, the bacillus of necrosis.

The necrotic processes in which this organism is found occur spontaneously in the horse, cow, pig, kangaroo, ape, stag, antelope and rabbit. The guinea-pig, cat and pigeon appear to be immune.

In the etiology of these diseases as they occur in animals, particularly in the pig, the teeth play an important part.

The bacillus of necrosis in animals occurs in the form of slender, straight or curved rods. (Fig. IX.) Several may be

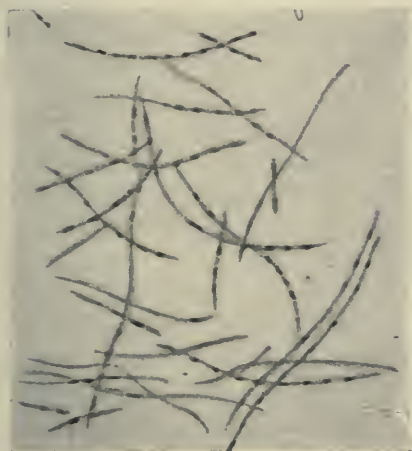


FIG. IX.—(AFTER JENSEN.) BACILLUS OF NECROSIS IN ANIMALS. FIG. X.—(AFTER JENSEN.) THE BACILLUS OF NECROSIS FROM A SERUM BOUILLON CULTURE (BANGS). CROSS OF A TENDON IN A HORSE.

joined end to end to form thread-like structures, and finer filaments are also seen. In addition, Schmorl observed micrococcus-like bodies. These may represent a stage in the development of new organisms. The organisms stain fairly well with carbol fuchsin and carbol thionin. Some show interrupted staining; some, although they stain but faintly, show within small, deeply staining rounded bodies. (Compare with Fig. V.)

It is anaerobic, and grows best on serum and on blood serum agar.

Stained in sections (Fig. XI.) it is found penetrating the apparently healthy tissue, beneath the necrotic area, in which it does not thrive, but gives place to the ordinary bacteria of putrefaction.

Freezing, a previous inflammatory condition, or the injection of lactic acid into the tissue, favors a successful inoculation in animals.

Jensen believes that other microorganisms sometimes prepare the way for the entrance of the bacillus of necrosis.

From the similarity in the clinical, bacteriological and histological features, it seems highly probable that these necrotic processes in animals are analogous to the noma of human beings, and the organisms present in both closely related.

TREATMENT.—In the infectious diseases of childhood attention

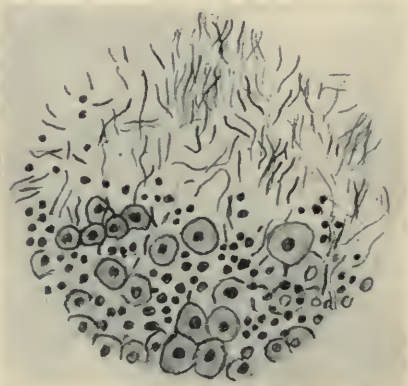


FIG. XI.—(AFTER JENSEN.) NECROSIS OF LIVER IN A COW. THE BACILLI OF NECROSIS ARE SHOWN: BETWEEN THE LIVER CELLS ARE LARGE NUMBERS OF LEUKOCYTES.

should be paid to all conditions which favor the production of gingivitis, especially as a more or less marked catarrhal condition of the mucous membrane of the mouth is regularly present in the exanthemata. Of these predisposing conditions the most important is the presence of diseased teeth. If carious, these should be removed.

If there is gingivitis, the tincture of iodine is applied to the gum and as far as possible to the space between the tooth and gum. If there are also ulcerative lesions in the mouth, these are also treated by the local application of the tincture of iodine.

The most rational method of treatment of gangrenous stomatitis would seem to be the early and thorough application of the cautery. As the histological picture shows, this should be introduced so as to destroy the finer filaments of the microorganism, which have already penetrated into the apparently healthy tissue.

CONCLUSIONS.—Although absolute certainty is impossible until pure, uncontaminated cultures and successful inoculations in

animals can be obtained, from the foregoing the following conclusions may be drawn with a fair degree of probability:—

(1) The microorganism which I should call the spirochæte of necrosis, corresponding to the streptothrix of Seiffert-Perthes, is the one which plays the most important part in the etiology of noma.

(2) This organism is identical with that found by Plaut, Bernheim, Vincent and others in the ulceromembranous lesions of the mouth, and also

(3) With the spirillum sputigenum and spirochæte dentium of Miller, found normally in small number in the mouth.

(4) Though apparently two organisms they are really different parts or different stages of development of the same organism.

(5) This microorganism is not a bacillus, but probably belongs to a family which serves as a connecting link between the bacteria and the lowest forms of animal life, the protozoa, namely, to the family of the spirochætæ.

(6) This explains why it cannot be stained and grown on culture media by the usual methods.

(7) This organism is probably present in the atmosphere in the form of very resistant spores. By being deposited on food, water, etc., they may be introduced into the body with these.

(8) This organism is closely related to the bacillus necroseos found in the necrotic processes observed in some of the lower animals.

(9) In the human body, this organism requires unusual and exceptionally favorable conditions for its growth and development. On this account noma is very slightly contagious. In order that a gangrenous process should result, there must be a preceding physiological change in the tissue, which renders it possible for the organism to penetrate, live and multiply in the apparently healthy portions.

(10) Ulcerative and gangrenous stomatitis represent different stages of the same process.

(11) The presence of diseased teeth undoubtedly plays an important part in the etiology of ulcerative and gangrenous stomatitis, partly by pressure and irritation, but *primarily* by producing a gingivitis, furnishing conditions favorable for the growth and development of the organism described; the space between tooth and gum serving as a storehouse for fresh supplies.

(12) In the infectious diseases of childhood, particular attention should be paid to the condition of the teeth. When diseased they should be removed.

(13) The most rational treatment of noma is the application of the Paquelin cautery. It should be introduced so as to destroy not only the necrotic tissue, but also the finer filaments of the microorganisms which have penetrated into the underlying apparently healthy tissue.

(14) The term noma is here used to indicate a specific necrotic process. Similar processes may occur in any part of the body, providing always that certain physiological changes have taken place in the tissues, which renders it possible for the microorganism to penetrate, live and multiply in the apparently healthy parts.*

(The illustrations are reproduced from drawings by my brother, Alfred A. Herrman.)

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* The discussion of this paper will be found on page 861 of this number of ARCHIVES OF PEDIATRICS.

NOTE ON A SERIES OF CASES OF STOMATITIS.*

BY HORACE H. JENKS, M.D.,

Philadelphia.

The purpose of this note is to call attention to a variety of stomatitis of which 12 cases have been seen this spring at the Children's Hospital, of Philadelphia, in the services of Dr. Griffith and Dr. Hand, through whose kindness I am enabled to make this report. The first 6 of these cases occurred within a few days of one another, and the rest have appeared at intervals of a few weeks.

CASES OF STOMATITIS.

Name.	Hospital Number.	Date of Admission.	Disease.
1. Lillian C.	124	3-15-05	Typhoid fever.
2. Joe S.	128	3-17-05	"
3. Harry D.	131	3-18-05	Pneumonia.
4. Mary K.	135	3-20-05	"
5. Pearl H.	138	3-21-05	"
6. Anna S.	142	3-23-05	"
7. Israel E.	147	3-26-05	"
8. Louis F.	152	4- 5-05	"
9. Thelma M.	179	4-22-05	"
10. Albert W.	200	5- 6-05	Typhoid fever.
11. Cora B.	207	5-10-05	"
12. Rosina d'O	226	5-21-05	"

The first case was seen on March 24, 1905, in a little girl, Lillian C., white, age three years. She was suffering with a mild attack of typhoid fever. Five days after her admission (the twelfth day of illness) a decided flushing of the right cheek below the malar eminence was noticed, and examination of the mouth showed an ulcerated patch about the size of a dime, opposite the upper anterior molar tooth on the mucous membrane of the right cheek. There was slight induration of the tissue surrounding the ulcer. No marked fetor of the breath was observed. The edges of the ulcer were well defined, but slightly irregular, and raised above the surrounding mucous membrane which was reddened and inflamed. The surface of the ulcer was covered with greenish black necrotic material, part of which could be scraped away, but not all. Cultures and cover-glass preparations were made from the ulcer. The cover-slip preparations showed at once many short polar-staining bacilli, resembling the Klebs-

* Read before the Philadelphia Pediatric Society, June 13, 1905.

Löffler bacillus. The cultures the following day showed similar bacilli, and the culture sent to the Board of Health was reported as positive for the Klebs-Löffler bacilli. Fearing the possibility of noma the child was at once operated upon by Dr. Hodge, the ulcer curetted, and its base and edges touched with pure nitric acid. The child was placed in the isolation ward and 4,000 units of diphtheria antitoxin administered. The next day a small ulcer had developed upon the left cheek, at a corresponding point to the one on the right, and another below the lower incisor teeth, between the gum and lip. This was the only spot at which the gum was involved. The submaxillary lymph nodes on the right side were swollen and evidently tender. The child was very fretful and took her milk poorly. Salivary secretion was increased. Cultures from the ulcers were reported as positive for Klebs-Löffler bacilli for fourteen days. In eighteen days from the onset of the stomatitis the ulcers were entirely healed, and the child discharged. This was the only case with visible external involvement of the cheek, and the only one which resembled at all a gangrenous stomatitis.

The second case was noticed the day after the first was seen. It occurred in another ward, in a boy, Joe S., age three years, white, in the second week of a moderately severe typhoid fever. His ulcers also developed one upon each cheek opposite the anterior molar tooth, and one on the mucous membrane of the lower lip. They were more superficial than in the previous case. The gums were pale and not bleeding. These ulcers spread slightly, that on the right cheek extending almost to the angle of the mouth from opposite the anterior molar tooth. Cultures from these ulcers were reported from the Board of Health as showing Klebs-Löffler bacilli. The child was removed to the isolation ward where he remained for twenty-two days before cultures from the ulcers were returned as negative for Klebs-Löffler bacilli.

The third case was noticed three days later in the Baby Ward, on another floor of the hospital. This case was seen just as it was beginning. There was a small yellowish-white ulcer on the right cheek, opposite the anterior molar tooth, a larger one about one-half inch in width on the mucous membrane of the lower lip, and one the size of a small pin head on the left cheek. There was no noticeable glandular involvement in this case, but fetor of the breath was marked. Later three small, pin-head sized ulcers de-

veloped on the lower lip. One of these grew larger, extending into the fold between the lips and gum and up the gum to the lower incisor teeth. These ulcers were healed in eleven days.

The remaining 9 cases were very similar to one another in appearance and course.

The age of the children varied from eleven months to three years; most of the cases were in children between two and three years of age. In none was there evidence of scorbutus. Two of the cases occurred in children who were seen to be biting their lips frequently, before any ulcer was seen. Five of the cases occurred in children suffering from typhoid fever, and seven in those ill with pneumonia.

The lesions were multiple in every case but one, when only a circular ulcer about one-fourth inch in diameter was seen, at the junction of the lip and gum below the incisor teeth. In the other cases the lesions numbered from three to five, usually three, and in practically the same situation in each case. The disease did not originate on the gum in any case, as far as could be determined, and while the gum was affected when first seen, in one case (Joe S.) the ulcers appeared further advanced on the cheek and lip than on the gum itself.

In 10 of the cases the appearance of the mouth was practically the same. In some cases the ulcer would appear first on one cheek and then on the fold between the lip and gum, below the incisor teeth, or *vice versa*. But by the second and third day of the disease the appearance of the mouth was as follows:

On the mucous membrane of each cheek, opposite the molar teeth at about the level of the meeting-place of the upper and lower jaw, is an ulcer, usually fairly circular, in size about one-fourth inch in diameter, but varying from that of a head of a pin, to one extending from behind the molar teeth to the angle of the mouth, about one and one-quarter inches (this in the later stages). A similar ulcer is present at the fold between the teeth and gums below the incisor teeth. The color is a yellowish-white—in the earliest stage of the disease—being surrounded in one case by a distinct pink areola. There is at first no marked excavation. The edges of the ulcer are clearly defined, slightly irregular, and not elevated. The surrounding mucous membrane is either unchanged, or slightly reddened. Breath is not offensive, salivary secretion slightly but not markedly increased. Pain is not evidenced, except when the ulcer is touched, when it appears to be

tender. The ulcer tends to spread quite rapidly along the mucous membrane, and but little as to depth. In the later stages there is on each cheek and on the lower lip a yellowish-white ulcer, its floor composed of small granulations, its edges red, distinct, slightly elevated above the surrounding mucous membrane, which is now reddened, slightly indurated, with, in some cases, quite marked injection of the capillaries. This continues for from six to twenty days, the yellowish-white color remaining, the ulcer gradually becoming smaller, with no new ulcers forming in any case after the second or third day. In the more severe cases the submaxillary lymph glands about the angle of the jaw are swollen hard and evidently tender, but showing no tendency to suppurate. The tongue is not noticeably swollen in any case. It is coated or not, apparently according to the condition of the digestive system.

Other than the appearance of the ulcer the symptoms were not marked, as the children were all sick with other diseases. There were no such symptoms as fever, prostration, vomiting, diarrhea, or anorexia that could be ascribed to the condition of the mouth alone.

The principal interest of the ulcer was in its diagnosis from ulcers of the mouth, usually described as ulcerative or herpetic (aphthous) stomatitis. The differences between such diseases of the mouth and that seen this spring at the Children's Hospital, are, as far as can be ascertained, as follows:

From ulcerative stomatitis this form differs in the absence of offensive breath and swollen, spongy gums. The tongue is not swollen in the latter form. Here, too, the gums rarely bleed, as they frequently do in the ulcerative form. Salivation is not as marked as in the ulcerative form. An important differential point is that in this latter form of stomatitis the ulcerative process begins on the mucous membrane of the cheek or lip, whereas in the ulcerative form it is apt to begin at the junction of the teeth and gums. A dirty yellow deposit at the junction of the teeth and gums is more frequently observed in the ulcerative form than in that seen at the hospital, but upon removal of this deposit bleeding does not occur in the latter form as it frequently does in the former. There is evidently more pain in the ulcerative form, from which also recovery is as a rule more rapid. There are also many points of similarity, such as will suggest themselves, between this hospital form of stomatitis and the true stomatitis ulcerosa.

Between this epidemic form and the herpetic form of stomatitis there are also many differences and many points in common. In the herpetic or aphthous form there are usually many lesions present, in the hospital form not over four or five. Another important point is that in the herpetic form larger ulcers are formed by coalescence of smaller ones, whereas in the hospital variety they are formed by extension from the original focus, these latter also extending deeply, as they never, or at most very rarely, do in the herpetic form. The lesions in the herpetic form are vesicular, whereas in the hospital form there is distinct *loss of tissue*. These latter ulcers are more yellowish than are the herpetic vesicles. The lesions in the hospital form were present only on the inner surface of the cheek, lips, or on the gum, just below the lower incisor teeth. No lesions were observed on the tongue or palate (except in case number 11, Rosina d'O., hospital number 226, where, in addition to yellowish-white ulcers on the lower lip, and one small ulcer on the left cheek, there were two ulcers on the soft palate, and a long, narrow, very superficial ulcer on the uvula).

It is to be regretted that we did not have at the hospital facilities for the complete bacteriological study of these cases. The supposition that Klebs-Löffler bacilli were present in cases 1 and 2 (Lillian C. and Joe S.) was based merely on the report from the City Board of Health, and on the study at the hospital of cover slip preparations made from culture tubes of Löffler's blood serum after from twelve to twenty-four hours' growth.

In conclusion it should be said that this note is not written with the intention of describing a *new* form of stomatitis, but merely to show how one variety of stomatitis will merge into another, and that while it is easy to make a diagnosis of stomatitis it is at times most difficult to designate accurately the variety that is present. The disease at the Children's Hospital most closely resembled the aphthous form, but it differed from it in being more severe as regards destruction of tissue, less painful, with the ulcers fewer in number, spreading by extension, and not by coalescence of smaller ones. It differed from the ulcerative form in the (usual) absence of offensive breath, profuse salivation, swollen, spongy gums, and by the ulcerative process beginning on the cheek or lip, and by its slow course.

It has been on account of these differences that the cases seemed to be of sufficient interest to report to-night.

Clinical Memoranda.

A CASE OF ACHONDROPLASIA.*

BY HENRY HEIMAN, M.D.,

Adjunct-Attending Physician (Children's Service), Mount Sinai Hospital,
New York.

Classed under the general head of dwarfism or partial infantilism is a group of diseases which clinically have some points in common and many points of resemblance; pathologically, some of these affections seem to be capable of osteogenetic differentiation. One of them, achondroplasia or chondrodystrophia fetalis, has recently been studied in America by Morse, West, Herrmann and others, and a number of cases has been reported; stimulated by the excellent work done by these authors, the writer puts on record the following case as a possible contribution to the literature of the subject.

Because of a genital abnormality which the mother desired corrected by operation, a male infant six months of age was admitted to Mount Sinai Hospital in June, 1905. After advising operative procedure for the hypoplasia of the penile structures, Dr. Chas. A. Elsberg, who had recognized the case as one of chondrodystrophia fetalis kindly suggested that local surgical treatment be followed by transfer of the patient to the medical service of Dr. Koplik for further observation.

There is no history of dwarfism in the family. The parents are people of at least average intelligence and physique; they are not blood relatives and have been married three years. An older child, two years of age, is normal in intelligence and appearance.

The previous history as to the birth, feeding, gastrointestinal disorders and infectious diseases is negative. The mother has never noticed any peculiarity in the appearance of the infant, and thinks that it is bright for its age.

It is because of the seeming absence of the penis, noticed since birth, that the patient is brought to the hospital. The urine has always been voided from a small, round orifice situated in the usual site of the penis. This fistulous opening is on a level with the surrounding skin, and underneath can be felt a small penile body about one-quarter of an inch long. When by appropriate

* Presented before the Section on Pediatrics, New York Academy of Medicine, October 12, 1905.

manipulations the lips of the orifice are everted, there are disclosed the prepuce and glands of a diminutive penis. When pressure is relaxed the tiny organ slips back beneath the skin. The left testis is in the scrotum, but on the right side is a hydrocele and congenital hernia. For the hypoplastic malcondition an operation which was performed on the prepuce has resulted in no decided improvement in the appearance and position of the parts.

On hasty inspection the most striking peculiarity in the appearance of the infant is the shortness of the limbs as compared with the length of the trunk. Especially short are the upper extremities; with the arms placed alongside the body the fingers do not reach to the level of the umbilicus.

More careful physical examination shows the following:—

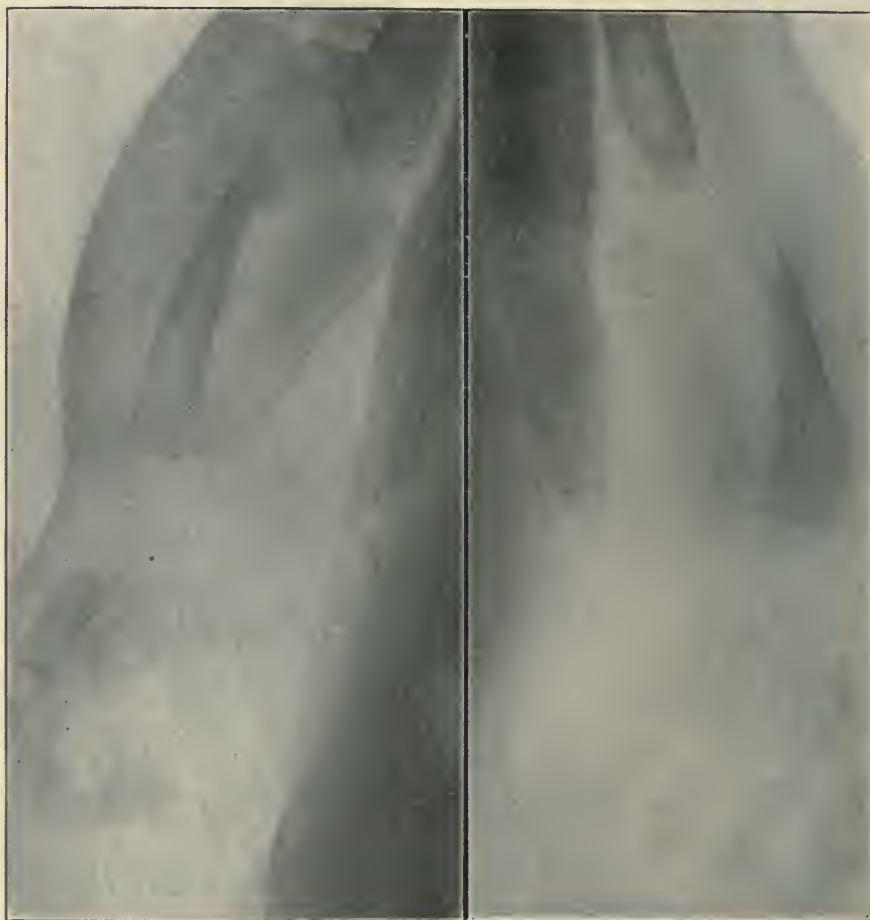
The patient is well nourished and seems to be in good general condition. The facial expression is almost imbecile; yet the infant has a pleasant countenance. The baby is able to make cooing sounds,

the voice seems to be normal, and the infant seems to be able to see and hear. The head is about normal in size, but rachitic in shape; the bosses are prominent; the anterior fontanel is wide open, the posterior is closed. The hair is sparse, absent from the occiput, but otherwise normal. The ears are considerably deformed; there are marked linear depressions on the right auricle. The eyes are negative. Strikingly peculiar in ap-



DR. HEIMAN'S CASE OF ACHONDROPLASIA SHOWING SHORTENED FOREARMS AND FLAT WIDE NOSE.

pearance is the nose, which is short, flat and retroussé; the bridge is broad and depressed; the nostrils are wide and are directed forward rather than downward. The tongue is normal. The gums are enormously hypertrophied, irregularly thickened, and show



RADIOGRAPH OF THE FOREARMS IN CASE OF ACHONDROPLASIA.

elevations and depressions seemingly corresponding with the sockets of the teeth; the gums are soft to the touch, but the mucous membrane is normal in color; the gingival tissue is redundant throughout the whole extent of the upper and lower alveolar borders. On admission there were no teeth; two months

later several teeth began to erupt. The hard palate is high-arched; the soft palate is thickened and extends almost to the posterior pharyngeal wall. There is no marked enlargement of the lymph nodes. The neck is short. The thyroid gland is not palpable. There is normal thymic percussion dullness. On the skin of the face and trunk is an eczematous eruption. There is no beading of the ribs. The conformation of the chest wall is normal. Examination of the heart and lungs is negative. The abdomen is protuberant (pot-belly). The anus is relaxed, the rectum is not prolapsed. The extremities are short, the bones are curved and thickened. The soft tissues of the forearms and legs are markedly redundant. The motions of the joints do not seem to be abnormally free. The hands are flat and show the trident deformity; all the fingers are nearly of the same length. The third toe on both sides is diminutive, deformed and without a nail. Most of the nails are ill-developed.

During the three months of observation the averages of measurements taken several times are the following:—

Length of body	56.0	cm.
Crown of head to umbilicus	30.0	"
Umbilicus to foot	26.5	"
Upper extremities (tip achromial process to end of middle finger)	19.0	"
Arms	8.0	"
Forearms	5.5	"
Hands	5.7	"
Lower extremities (anterior superior spine of ilium to internal malleolus)	21.0	"
Thighs (great trochanter to knee)	11.5	"
Legs (knee to internal malleolus)	9.0	"
Circumference of neck	20.0	"
" " chest	38.5	"
" " abdomen	40.5	"
Suboccipito-bregmatic diameter of skull	12.60	"
Suboccipito-frontal " " "	13.60	"
Occipito-frontal " " "	14.00	"
Occipito-mental " " "	14.50	"
Biparietal " " "	11.00	"
Bimalar " " "	9.25	"
Occipito-frontal circumference " "	41.00	"

While the patient was ill with enteritis there were temperature elevation occasionally reaching 104°F. , and attacks of abdominal distension. At other times a subnormal temperature was frequently present. The weight varied from $10\frac{1}{2}$ to 13 pounds. The height on admission was 55 cm. (61 cm. is about normal for a child of six months); three months later the height was 57 cm. (64.5 is about normal for a child of nine months). The urine was negative. The hemoglobin percentage was low, about 35 per cent. Except for abnormal curvature and thickening of some of the long bones, radiographs that were taken showed nothing noteworthy.

Summing up the important points in the physical examination, we may say that the noteworthy features are:—

Evidences of deficient mentality.

The broad flat nose with sunken bridge.

- The redundancy of the gingival tissues and the high-arched palate.

The short, stumpy limbs with redundancy of the soft tissues.

The disproportion between the length of the trunk and extremities.

The trident deformity of the hands, approximation in length of all the fingers, and malformation of the toes and toe-nails.

The penile hypoplasia.

Retarded growth of the body as evidenced by the weight and height.

The subnormal temperature.

56 West 120th Street.

A CASE OF CRETINISM.*

BY HENRY HEIMAN, M.D.,

Adjunct-Attending Physician (Children's Service), Mount Sinai Hospital
New York.

Cases of cretinism which show rapid improvement under treatment with thyroid extract are not uncommon; yet the surprising transformation occurring in such cases is always of interest and prompts me to present the following case before this Society.

* Presented before the Section on Pediatrics, the New York Academy of Medicine, October 12, 1905.

The patient first came under observation in February, 1905, when seventeen months of age. No family history of idiocy, con-



DR. HEIMAN'S CASE OF CRETINISM BEFORE AND AFTER TREATMENT.

sanguinity, goitre or other possible etiological factor was obtainable. Two older children were healthy and intelligent. The baby was breast-fed only for two months because it was no longer

able to nurse properly. After an easy labor it seemed perfectly well until about the sixth month, when it had pertussis. Somewhat later the mother noticed that the infant was getting fatter, that its abdomen was increasing in size, and that it was not as bright as the other children had been at the same age. When one year of age, according to the mother, the baby looked stupid, was unable to support its head, slept nearly all the time and constantly protruded its tongue.

A mere glance at the photograph taken nine months ago will show that there could have been no doubt as to the diagnosis. The usual thyroid treatment was started immediately and has been continued to the present. That the result has been gratifying is shown by comparison of the photographs taken nine months ago and a few days before the time of writing respectively, and also by perusal of the following table in which are shown the more important changes in physical examination that have come about.

	February, 1905. Age 17 months.	October, 1905. Age 26 months.
Mental condition.	Imbecilic.	Evidence of intelligence now present.
Facial expression.	Stupid.	Bright.
Skin	Rough and hard.	Smooth and soft.
Hair	Sparse and course.	Abundant and fine.
Spinal column ..	Kyphosis.	Unchanged.
Support of head.	Head falls backward.	Head now held upright.
Nose	"Saddle" in type.	Still so.
Tongue.....	Large and thick, constantly protruded.	Macroglossia still present, but protrusion is now infrequent and slight.
Weight	15½ pounds.	19 pounds, 2 ounces.
Length	60 cm.	71 cm.
Abdomen	Protuberant.	Abdomen not abnormally prominent.
Umbilicus	Hernia present.	Hernia no longer present.
Temperature ...	Subnormal (average about 97°F.)	Temperature now normal.

ARCHIVES OF PEDIATRICS.

NOVEMBER, 1905.

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GONOCOCCUS OPHTHALMIA.

At a meeting of the Section on Pediatrics of the New York Academy of Medicine in March, of this year, the subject of gonococcus infection in children was presented and discussed, and many interesting points were brought out. It was shown that gonococcus vaginitis in children is a very frequent disease among all classes, extremely intractable in its course, highly contagious, requiring rigid quarantine of affected children as well as nurses and attendants, and in severe forms capable of being dangerous

to life on account of possible acute gonococcus pyemia. Previous to the appearance of the papers read at this meeting there had appeared, during the last few years, a number of others dealing with this same subject and emphasizing the remarkable frequency of this disease in children.

It is probable that the affection existed in quite as large a number of cases in years past, and that the increase in frequency is more apparent than real, due to the greater care which is now taken to exclude all forms of contagious disease from hospitals and the consequent resort to microscopical examination of the smear made from the vaginal secretion or discharge. Such an investigation is now undertaken in every suspicious case; and in the children's wards of most hospitals it forms a regular part of the physical examination of every applicant for admission—certainly a more exact means of diagnosis than when the clinical picture alone was depended upon.

Notwithstanding the apparently greater prevalence of this vaginal infection in children, there has been no increase of gonococcus ophthalmia either in the newborn, in children, or in adults. This is proven by the experience of ophthalmologists in general, and borne out by statistics obtained from the annual reports of the various eye hospitals and clinics. On the contrary, there has been a decided diminution in the number of cases of gonococcus conjunctivitis. The writer gathered the reports of all such affections occurring among the patients of three large eye clinics of this city during the period of 1890 to 1894, and compared these with those reported during an equally lengthy period extending from 1900 to 1904. During the first five years, the proportion of cases of ophthalmia neonatorum to all conjunctival affections was about 1:100 and of gonorrheal (adult) ophthalmia about 1:200; during the latter period of five years, the proportions were about 1:500 and 1:650, respectively. This reduction of frequency must be all the greater since resort to microscopical examination of the smear of the conjunctival se-

cretion is now undertaken with much more regularity than was the case ten years ago; so that at present, mild cases escape detection less frequently.

The most effective cause of this reduction in the frequency of ophthalmia neonatorum is, of course, the introduction and employment of Credé's method of prophylaxis; in addition, the law which compels midwives to report every case in which there is any suspicion of conjunctivitis has had its good effects. In the adult, the probable explanation lies in the better education of the male public on the dangers of conveying any of the secretion from the urethra to the eyes by means of the fingers; for we have no evidence that there has been any reduction in the frequency of this form of urethritis.

In the great majority of cases of gonococcus ophthalmia, whether the infection be mild or severe, the prognosis is good, provided proper treatment be instituted sufficiently early—before the process has invaded the cornea. In infants, the general bodily condition must be reckoned with, since treatment can be carried out much more efficiently and thoroughly, and the chances of recovery without damage to the sight are always greater in healthy than in feeble subjects.

The introduction of the organic silver salts, such as protargol, argyrol, and the like, has given us the means of destroying the gonococci without causing the pain and irritation which accompanies the use of solutions of nitrate of silver. But there is still much difference of opinion regarding the relative merits of these two classes of silver preparations. Though probably a majority of American ophthalmologists now use solutions of protargol and argyrol in the early stages of gonococcus ophthalmia, where formerly silver nitrate would have been employed, there exists some opposition to this substitution, notably on the part of German authorities; the latter claim that, although the nitrate of silver has the disadvantage of being irritating and painful, it is more reliable.

This difference of opinion regarding the relative merits of the organic salts and of nitrate of silver applies not only to their uses during the course of a gonococcus conjunctivitis, but exists particularly in connection with the employment of these remedies as prophylactic agents for the prevention of ophthalmia neonatorum, particularly in hospital practice.

For many years the writer watched the effects of instillations of solutions of protargol (25 per cent.) into the eyes of the newborn, compared these with the results obtained when a 2 per cent. solution of silver nitrate was used, and came to the conclusion that, in hospital practice at least, the silver nitrate solution was the more reliable as a prophylactic agent.

Regarding a preference for one or the other of these two classes of silver preparations in the treatment of gonococcus conjunctivitis, the differences of opinion may be explained by a failure to consider the indications for each.

The organic salts of silver are indicated in the early stage of the conjunctivitis, which period is marked by the occurrence of a profuse discharge; and the particular use which they subserve is the destruction of the gonococci. Experiments show that this germicidal action is just as efficient as with silver nitrate, equally penetrating, and accompanied with no irritation or pain; hence such remedies can be used much more liberally and much more frequently than the nitrate. To be efficient, however, the solution of protargol or argyrol must contain from 25 to 50 per cent. of the remedy.

The solution of nitrate of silver, on the other hand, answers an entirely different purpose: After the stage of purulent secretion has subsided and the conjunctiva presents the well-known papillary appearance, a 1 per cent. solution of nitrate of silver is indicated—not as a germicide, but as a stimulating and irritating agent, intended to bring the mucous membrane back to a normal state of smoothness; in this stage, applications of the stick of sulphate of copper will accomplish the same result.

CHARLES H. MAY.

Bibliography.

Vital Questions. By **Henry Dwight Chapin, M.D.** New York: Thomas Y. Crowell & Co., 1905. Pp. ix-189. Price, \$1.

The physician who is a teacher and a clinician usually undertakes the study of disease as it relates to the morbid process presented and leaves the unfortunate sufferer with no more than a passing mention. If the disease is one of obscurity or rarity it may be grouped with others so that theories of origin or therapeutics may be elaborated. However close an association the physician has with the individual patient he too often passes without comment the influences of heredity, environment, education and health, all of which have decided influence on the well-being and contentment of our race. It is unusual to take up a book such as is before us and find that the physician-author is not collating individual cases nor giving therapeutic suggestions, but that he is urging members of his profession to take a broader view of their field, which in the nature of their calling gives them a special insight into the needs and questions of the day. The author urges that the public should get from the medical profession more than the healing of physical ills, it should also receive from physicians instruction upon the mental, moral and social aspects of living. The chapter headings offer many suggestions and with the subheadings explain the character of the book. Some of these are: "Poverty: The Question of Subsistence"; "The Child: A Hopeful Question"; "Health: The Question of Vigor"; "Education: The Question of Training"; "Happiness: The Question of Contentment."

Parts of the book were first printed as essays in monthly periodicals, but these contributions have been changed and extended.

The volume, which is dedicated to the memory of Dr. Christopher, should be read by all physicians who are willing to accept their place in life as one that fits them to instruct the community. It is of especial interest to pediatricians who so frequently see the moral and physical stigmata which are the results of ignorance and disease.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, October 12, 1905.

L. E. LA FÉTRA, M.D., CHAIRMAN.

DR. HENRY HEIMAN presented

A CASE OF CRETINISM,

with photographs of the patient before and after nine months' treatment. The full history of the case is to be found on page 846 of this number of ARCHIVES OF PEDIATRICS.

DR. HEIMAN then presented

A CASE OF ACHONDROPLASIA.

The full record of the case is to be found on page 842 of this number of ARCHIVES OF PEDIATRICS.

A CASE OF DWARFISM DUE TO RICKETS.

DR. FREDERICK L. WACHENHEIM presented this patient because of some deformities which might lead one to think of chondrodystrophy. The child was three and a half years old, with normal intelligence. There were a number of other children in the family showing conditions somewhat similar. The head and face were typically rachitic. There was a depression of the nose and the palate was flat. There was a flattening of the thorax and the arms showed thickenings at the epiphyseal ends. The most remarkable thing regarding the case was the condition of the legs. Both femora were short and had a deformity due to green stick fractures. The tibia showed this deformity to a marked degree. The chief point of interest was the shortening of the femora. There was no knowledge on the part of the mother that fractures had occurred. There was also a remarkably good demonstration of the rachitic hand, with spindle phalanges.

DR. CHARLES HERRMAN said that the case of rickets showed marked curvatures. This, however, was not against the diagnosis. In some cases the curvatures were even greater.

With regard to the case of chondrodystrophy presented by Dr. Heiman, it was atypical in so far as the legs were not shortened. Notwithstanding this, the case probably belonged in that group. The condition, he believed, was not so rare as was generally sup-

posed. Many died at, or shortly after, birth. He had seen a dozen cases in adults on the streets, on the vaudeville stage and at other performances.

DR. NATHAN said that because the lower extremity was longer would not militate against the condition being one of chondrodystrophy. The fact that the intelligence was affected, the peculiar condition in the mouth and the general make-up of the child, if anything, spoke against it. The upper extremities were quite characteristic, and Kaufmann described pathologically some cases in which the extremities were not at all shortened. Dr. Nathan, referring to Dr. Wachenheim's case, had seen thousands of cases of rickets, but he never saw one deformed to this extent. At the Hospital for Ruptured and Crippled they never saw such complete turning round of the limb as presented in this child. In this case fractures could be made out, a number of them in the femora. The case would remind one of osteogenesis imperfecta. Whether there was a combination of rachitis and some other bone trouble, possibly osteogenesis imperfecta, he was unable to say positively, and thought that the use of the X-ray would be of value in determining the condition and density of the bone. In rachitis it was very different from osteogenesis imperfecta.

A CASE OF HEREDITARY SYPHILIS WITH BONE LESIONS.

DR. NATHAN presented a young girl who came to him two and a half years ago with a swelling of the ankle which looked like a tubercular arthritis, and she was treated exactly as one would treat such a condition. No history of syphilis was obtainable, and there was no possibility of making any differential diagnosis. After treating her for a few months he noticed that the condition was not a localized one, but extended along the tibia, a very important differential point in making a diagnosis between a tubercular and syphilitic osteitis. In syphilis there would be a periosteitis or chronic osteomyelitis and a swelling of the bone beyond the region of the joint. Later on the gumma broke down, not into the joint, but externally. Tubercular foci most often break into the joint and not externally, the contrary being true in syphilitic osteoarthritis. This girl was put on antisiphilitic treatment and she rapidly got well. Recently, more characteristic lesions of syphilis were to be noted along the tibia, the osteophytes. This condition was supposed by many to be due to a syphilitic periosteitis, but he found that it was most often due to a central gumma unilateral.

A CASE OF MALARIA WITH CEREBROSPINAL SYMPTOMS.

DR. M. NICOLL, JR., reported this case. The patient was a boy five and one-half years of age, son of a United States Army Surgeon.

Previous History.—Bronchopneumonia of a severe type in infancy. A severe obscure illness of six weeks' duration in 1903 at Cienfuegos, Cuba, in which there was great dilatation of the stomach and nausea, together with diarrhea, alternating with constipation and chalky stools. The temperature was never over 102° F. The Cuban physician thought the disease was malaria of a remittent type, but the plasmodium was not found and quinin was not effectual. The child left Cuba in January, 1904, and had been in good health up to the time of the illness to be described.

On July 10th of this year he received a slight lacerated wound of the foot while wading in salt water, caused probably by a clam shell. The wound was dressed almost immediately. Two days later the mother noticed that the child was irritable and at times drowsy. The sleep was restless, and he complained that the pillow hurt his neck. Calomel was given in divided doses, and he was up and about the next morning. During the afternoon he slept on his side with head drawn back, and while standing or walking the latter was held stiffly in the same position, causing him to remark that he could not see his feet. The temperature in the evening was 102° F. During that night the position of the head remained the same, and when changing his position in bed he turned on the back of his head. Slight sounds caused him to start in his sleep.

The next morning his stools showed the effect of calomel. The wound in the foot had nearly healed, but the father having the possibility of tetanus in mind laid it open freely and treated it as though infected. On July 14th, four days from the beginning of the illness, the morning temperature was 103° F.; the bowels moved freely from the effect of medication and rectal irrigations. The patient was seen at eleven o'clock in the morning in consultation with the father and found the condition briefly as follows: The boy was well developed; the heart and lungs were negative; the spleen could not be felt nor did the area of dullness appear to be increased. There was no abdominal tenderness. The head was retracted to a marked degree. The sternocleido mastoid muscles were tense. The head could not be bent forward with any justifiable degree of force, and attempts to do so caused pain referred to the back of the neck.

In the afternoon the temperature had risen somewhat, and in addition to the condition described, other groups of muscles, especially of the upper extremities, showed intermittent spasms. The boy's fingers twitched constantly, as did also the muscles of the face. The eyes were abnormally bright, and there was noticeable cerebral excitement, the whole appearance suggesting an approaching convulsion. Baths were ordered to reduce the fever during the night and a supply of tetanus antitoxin telephoned for from New York. An examination of the urine at this time was negative. An examination of the fresh blood showed plasmodia of a hyaline type, and in consequence bimirate of quinin was given, 12 grains between 5 P.M. and morning, when a second blood examination showed the same type of organism, although the temperature had fallen somewhat and the child seemed better. During the next twenty-four hours 18 grains of quinin were given and the temperature and pulse-rate rapidly fell, until thirty-six hours after beginning medication the patient had completely recovered.

Had it not been for the wound of the foot in surroundings where tetanus is not infrequent the possibility of that disease would probably have not occurred to our minds, especially as the incubation period would have been less than forty-eight hours, an unusual, though not unheard of, occurrence; and furthermore, while there was a suggestion of it, there was at no time typical trismus, and nourishment was taken without difficulty. Acute meningitis was, of course, thought of, but the condition lacked several characteristics of that disease.

Spasms of various groups of muscles, with or without convulsions, are not uncommon in malaria, especially in very young children, but Dr. Nicoll had not seen nor had he been able to find recorded a case so suggestive of involvement of the brain and spinal cord, caused by this disease.

DR. WILLIAM B. NOYES said that, in 1895 at the Columbus Hospital, he saw a case similar to the one reported. The patient was a man of fifty years, an Italian, who had been found lying in coma with stertorous breathing, and the condition was not diagnosticated then. It was thought possibly it might be a case of uremia or that he had a cerebral hemorrhage not giving localized symptoms. There was no hemiplegia. Just before the patient died the blood was examined and found to be filled with pigment. He did not know of what type the parasite was. At the

autopsy they found no lesions except congestion of the brain. The sections of different parts of the brain showed a beautiful stain, or pigmentation, outlining the capillaries in the specimen. The capillaries were filled with pigment. He could not recall other lesions in the body. The patient died from pernicious malarial fever. The pigment seemed to be responsible for the general state of coma.

DR. HENRY HEIMAN said that the first crescentic malarial organisms that were stained in this city came from a patient who was admitted to Roosevelt Hospital with symptoms similar to those presented by Dr. Nicoll's case. This patient also was in a comatose condition and presented signs of "meningism." At autopsy, Dr. Ewing found that the capillaries of the brain contained numerous parasites of pernicious type, *i.e.*, crescentic. These organisms are sometimes found also in the bone marrow and the viscera. Dr. Heiman added that the pernicious types were rarely seen north of the Mason-Dixon line, the geographical boundary established by Osler. However, several cases had been reported, and he himself had placed one on record which occurred a few years ago in a child who had always lived in New York City. He believed that the malarial infection in Dr. Nicoll's case was probably imported from Cuba, the parasite having remained dormant in the system until the outbreak of the disease in the North.

DR. JACOB SOBEL said he thought that possibly they might be dealing with a grave form of tetany; the form was associated with opisthotonos, and he asked Dr. Nicoll if the Trousseau's phenomenon was present.

DR. L. E. LA FÉTRA said that the subject of malarial poisoning was an interesting one, especially those cases in which cerebral symptoms were present. In connection with the cerebral type of malaria there were two other types which should be kept in mind: (1) Those cases with marked respiratory symptoms, and (2) those with cardiac symptoms. In the first, there were signs simulating those of a pneumonia, fever, rapidity of breathing and, strange to say, similar auscultation signs in the chest. These were very deceptive cases. There was probably a marked congestion of the lungs with the capillaries filled with malarial poison as they were in those cases with cerebral symptoms, where the capillaries of the brain contain the organisms in abundance.

In the second class of cases, the cardiac, there was fever, rapidity of the pulse, dyspnea and prostration. One of these cases he saw last summer and the question arose as to whether the child had some serious heart lesion engrafted upon an old congenital trouble. The child had been under observation for some time and was known to have congenital heart disease. It was thought that the fever had produced some change in the heart's action and perhaps dilatation. The cyanosis and dyspnea were thought to be due to changed heart action, but an examination of the blood revealed the malarial parasite. Treatment with quinin quickly cleared up the dyspnea entirely.

DR. M. NICOLL, JR., said, with regard to tetany, that he had always felt that it was not a pathological entity, and the Trousseau's symptom referred to was not elicited. He was inclined to think his case was a development of the organism which had been lying dormant in the system. The patient had not been out of Cuba more than nine or ten months, and had lived there for the three years preceding.

MYOTONIA CONGENITA, OR THOMSEN'S DISEASE.

DR. FRANK S. MEARA reported the case, which will be found in full on page 812 of this number of ARCHIVES OF PEDIATRICS.

DR. J. RAMSAY HUNT said that the case reported was a typical example of this interesting affection. With regard to the statistics quoted from Starr (30 cases), he believed that there were many more cases on record; he remembered that in 1897 Mikinoff, in his thesis, had collected 100 cases, and in the original family of Dr. Thomsen 12 or 14 cases were recorded. The pathology of the affection was very obscure, and the theories still at variance. One recorded autopsy, that of Déjérine and Sotta's, was entirely negative so far as the nervous system, both central and peripheral, was concerned. The muscles, on the other hand, showed hypertrophy, both *en masse* and microscopically, with vacuolations and increased nuclei. Some believe in the autointoxication theory, but they were very much in the dark regarding it. Since the description of myotonia congenita the affection had assumed a much wider interest and has been found associated with many organic affections of the nervous system. It may also be acquired late in life (myotonia acquisita). It has been found complicating a neuritis as well as affections of the spinal cord, such as locomotor-ataxia and syphilitic affections. The acquired forms are inter-

esting, because some of them get well. In his own work in New York he had seen within the last five years 2 cases. One a case of acquired myotonia coming on at the age of twenty-five, and confined to the muscles of deglutition, mastication and of the hand; the case was more or less stationary. Dr. T. W. Hastings made a careful chemical analysis of the urine, but there were no abnormal constituents found. The other case, one of Dr. Hammond's, was interesting because of its localization in the lower extremities, in an otherwise typical case. In the classical cases of myotonia congenita the spasmodic state was universal, although more marked in the legs, arms and muscles of face. The patient was a young girl, fourteen years old, and such a partial myotonic condition was most interesting and rather tended to disprove the theory of auto-intoxication, or general muscular intoxication. Some groups of myotonias were difficult to interpret and classify. Instead of being associated with hypertrophy there were a group of cases associated with atrophy, the atrophy being progressive and coming on in the hands and legs, and progressing with symptoms of myotonia. Some of these atrophic cases were central in origin and others apparently secondary to the myotonia. The muscular affection being followed by an atrophic condition of the muscles.

In speaking of myotonia it were well to refer to an allied condition which was called paramyotonia (Eulenburg), which came on in otherwise healthy individuals after exposure to cold. Cases had been described in which the symptoms of myotonia with typical electric reactions had been associated with paramyotonia. The paramyotonia was supposed to be due to a vascular spasm from exposure to cold, and producing ischemia of the muscles.

Dr. Schwarz said there was another form of myotonia occurring in young infants, within the first six months of life, associated with light forms of gastro-enteritis and congenital syphilis, with increased galvanic irritability and accompanied with balling and extension of the fist, the so-called fist phenomenon described by Hochsinger. Trousseau's sign was not present. It was to be distinguished from tetany in young children in that one did not meet with the general nervous phenomena such as laryngismus stridulus.

THE ETIOLOGY OF NOMA.

DR. CHARLES HERRMAN read the paper of the evening with this title: it will be found in full on page 817 of this number of ARCHIVES OF PEDIATRICS.

DR. HOWARD LILIENTHAL said that he knew very little about noma and that he really came to be instructed. He said he was not a bacteriologist, although he understood the germ theory of disease, and it seemed to him quite remarkable, considering the enormous number of poorly nourished children who were affected with the exanthemata and who presumably have the spirochætæ in their mouths, that noma was such a rare sequela. It also seemed strange to him that a disease that depended upon one widespread organism, should ever be curable under the conditions in which it occurred. The mere fact of burning out the focus of the disease with the cautery might check the disease locally in a number of cases, but why it should prevent immediate re-infection he did not know. It had not changed the general condition of the patient, only removed the affecting organisms at one point. On the contrary, it had destroyed the tissues of the mouth, which would form a slough and which must be cast off. He did not see why the disease should be, or could be, cured in that way. He was quite sure it was never necessary to kill all the bacilli, or pathogenic micro-organisms, as for instance, in tuberculosis. The idea was to place the patient in such general condition that the body cells would be able to fight the disease. Of course it was possible that the burning out with the cautery took away the poisonous tissue from which the patient might be absorbing toxins and gave a chance for recovery to occur. It did seem to him that if there was a direct inoculation by microorganisms the mere fact of burning or injuring the mucosa should invite further infection as in erysipelas. The last word regarding noma he did not believe had been said.

A few months ago a little patient was admitted to the children's surgical ward in the hospital and Dr. Koplik, who saw the case in consultation, advised complete isolation and removal from the ward because of the contagiousness of the disease. Dr. Lilienthal had seen but few cases and was surprised to hear that it was so contagious. He immediately spoke to several of his surgical friends who were on duty in the various hospitals in New York, and not one of them, he said, was willing to go on record as saying that the disease belonged in the same class with erysipelas as to contagiousness. Not even would they say that if in the same ward with children who were recovering from measles or scarlet fever the others would contract noma. Not one would say that the disease had ever spread in any ward in which it was treated.

They all "hedged," saying the disease was offensive and a very good one to get rid of, etc. Dr. Lilienthal said he would like to have light thrown on this point. It seemed to him that the earlier the operation the better were the chances for recovery. He believed that if noma was due to any specific organism in the mouth that accidental and operative wounds about the mouth should commonly show some signs of infection following; as a matter of fact, wounds in the mouth healed with great promptness because of the great blood supply.

DR. JACOB SOBEL said that, during the past ten years, he had seen 3 cases, and all died. The first case he saw in 1895; the attack followed measles. Another case was supposed to follow measles. The third case he had seen at the Lebanon Hospital with Dr. A. Mayer. Although many reports had been given none arrived at any definite conclusion. He did not believe that all cases of gangrenous stomatitis were due to one and the same organism. He could not conceive why some of the cases should not recover, while other cases, apparently hopeless from its incipency, should. A pre-disposing factor had to do with cleanliness. The fusiform bacilli had been benign in the cases of ulcero-angina and gingivitis that he had seen.

With regard to the contagiousness of noma he said that no new case had developed in those instances in which isolation had been carried out. He believed the condition to be a contagious one and he believed it always to be the wiser plan to isolate such cases.

Walsh had reported 8 cases of noma in which the diphtheria bacillus had been found; these were cases that should be classed by themselves. When they were found in pure culture and antitoxin given the chances for recovery were increased. He thought that gangrenous stomatitis was a form of moist gangrene.

DR. J. FINLEY BELL, of Englewood, said that last summer he saw a patient, five years old, who entered the Englewood Hospital, brought there from some summer home for children. This child had been in the care of this organization for about four or five months. The patient had a frank pneumonia and after it had resolved a sore was noticed in the mouth. The day following it was noticed that the sore had spread. Fearing that it was a noma he had the wound cauterized with nitrate of silver and on the day following he was positive that he was dealing with a case of noma. From the smears made from the ulcer the fusiform bacilli were found. After four or five days a bleb formed at the side of the

nose, which was carefully punctured, a culture made and the streptococci found. When that was inoculated into the guinea-pig it lived less than three days and died without any marked pathological change. The gangrene lasted four days when the child died. The gangrene involved the whole side of the face from the eye down to the border of the jaw and spread with great rapidity.

DR. A. MAYER said that in all probability the name noma embraced more than one disease. Before the era of antitoxin treatment of diphtheria it was not uncommonly found that noma followed diphtheria. He said he had seen, perhaps, 3 or 4 cases of noma following diphtheria. One case of his own he saw one year ago, the patient being brought to Lebanon Hospital in a moribund condition. He ordered that the antitoxin be immediately injected and, four or five hours later, he saw the patient at the hospital. He showed photographs of this patient, a very severe case. The ulceration had extended all over the jaw, a part of both upper and lower maxillæ being exposed. The patient lived two days as a result of the antitoxin treatment. He believed that if this patient had received the antitoxin treatment during the early stages of the disease recovery would have followed without further treatment. A culture was taken and a mixed infection discovered of the Klebs-Löffler bacillus with the streptococci supervening. It was in reality a streptococci infection.

In looking over the literature he said he was surprised to find the number of treatments that had been advocated, but a recent method had been proposed which seemed to be of value—*i.e.*, the use of the electric light (incandescent) through red glass; there should be a sixteen candle-power.

DR. J. L. BLUMENTHAL recalled a case that had developed in the wards of the Randall's Island Infants' Hospital in this city. The child was fourteen months old and had had no diphtheria, measles or other disease for the previous six or eight months. The child was suddenly taken ill and something wrong with the mouth was noticed. Blisters within the mouth appeared and were touched with carbolic acid. In a few hours the blisters had spread and the gums became gangrenous. This gangrene spread all over and the case was then operated upon. Several teeth were removed and it was necessary, in order to do a thorough operation, to remove a portion of the hard palate. Upon doing this the nasal cavity was exposed from the mouth. All the exposed surface

was swabbed with nitric acid. From his observation of this case he did not believe that the cautery would have done much good; the gangrene spread so rapidly nothing could be done except what was very drastic, such as nitric acid. This patient was kept in the ward with other children who were not in good condition and since then, five years ago, no cases of noma had developed in that hospital. The child made a perfect recovery. The portion of the palate remaining continued to grow and was now completely covered in so that it was difficult to tell where an operation had been performed without very close inspection. The gingival portion grew so that in four months after the operation no one looking at the child's face could tell that an operation had been performed.

Dr. M. NICOLL, JR., said that, when the antitoxin treatment of diphtheria first came into vogue, he was in hospital and he saw a great many cases of noma and all occurred practically in the same class of patients—*i.e.*, those who suffered from diphtheria and measles, usually one following the other. Since the antitoxin had become of general use and immunizing doses were so often administered, the disease had become very rare.

Dr. L. E. LAFÉTRA said that he was on the service at the Randall's Island Hospital when the case of noma referred to had occurred, and that he could confirm all that had been said regarding its severity and the satisfactory result achieved by Dr. Bainbridge, the attending surgeon. The relation between noma and the diphtheria bacillus had already been alluded to and he believed that the majority of the cases were due to the Klebs-Löffler bacillus.

Dr. CHARLES HERRMAN, closing the discussion, said that it was not surprising that the diphtheria bacilli should be found occasionally in the lesions of noma. If the patient had diphtheria the toxins acted like those of other infectious diseases in producing the physiological changes in the tissue which rendered the penetration of the spirochaetæ possible. The administration of immunizing doses of antitoxin in measles lessened the number of cases of noma by preventing one more infectious disease. The spirochaetæ described and demonstrated were found not only in the mouth, but also in other parts of the body, where similar necrotic processes might be produced, providing the necessary physiological changes had taken place in the tissues.

Noma, he believed, was but slightly contagious.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, October 10, 1905.

JAMES H. MCKEE, M.D., PRESIDENT.

INTRA-UTERINE AMPUTATION.

DR. MILLICENT B. HOPKINS showed a boy of ten years, of Russian parentage, whose left arm had been amputated in utero, just below the elbow. Six out of nine brothers and sisters are living, and no other one shows any defect.

Dr. Hopkins then showed a girl of ten, with

CHOREA, COMPLICATED BY DOUBLE MITRAL DISEASE.

The patient was a girl of ten years, who had a severe attack of tonsillitis at four, and several attacks of rheumatism later. The heart condition, with the chorea, was first noticed in March, 1901. Now there is marked throbbing of the vessels of the neck, and venous pulse in both jugulars is plain. The heart is greatly hypertrophied, and both presystolic and systolic murmurs are audible.

MASTOID OPERATION IN EARLY INFANCY.

DR. HOPKINS showed also an infant with middle ear disease, in whom radical operation for mastoiditis was performed at nine weeks of age. The facial palsy occurred before operation.

DR. L. J. HAMMOND said that cases of facial paralysis should be of great interest both from the standpoint of diagnosis and prognosis. Not only is it extremely important to differentiate in which of the three possible regions the nerve is involved, but as well the cause of the involvement should be considered before it would be possible to say what the outcome of any individual case would be. The nerve may be involved intracranially, intrasegmentally or peripherally.

His experience has been that in most cases the lesion has occurred in the bony segment, arising from disease of the middle ear. The group of symptoms characteristic of lesion within the Fallopian canal, external to the geniculate ganglion, are complete unilateral paralysis of all muscular movements, absence of hemiplegia, decidedly abnormal electrical reaction, loss of reflex associate movements, paralysis in the upper and lower halves of the face. The fauces, palate and uvula may also be paralyzed, through the interference with the great superficial petrosal nerve

just before it joins the sphenopalatine ganglion. If, however, the ganglion is involved, we have, in addition to the before mentioned paralysis, dryness of the mouth on the same side, with some loss of taste in that half of the tongue and increased sensitiveness to musical sounds.

When the paralysis is of central origin, anywhere between the nucleus in the pons and the bottom of the internal auditory meatus, paralysis is not complete, as the branches supplying the eyelid are not affected; thus winking is possible. This is a point of great importance in the differential diagnosis. There is also associated with the intracranial lesion hemiplegia of the opposite side; electrical reactions may be normal; there will be persistence of the associate reflex movements; there is muscular atrophy throughout the area of distribution of the nerve; there may be internal squint from the involvement of the abducens nerve; some degree of deafness may also exist because of the involvement of the eighth nerve.

When the lesion is peripheral the paralysis may not be complete, as it will involve only those muscles that are controlled by the special fibres involved.

Should conservative treatment not bring about recovery within a reasonable time, surgical treatment, with the object of removing the pressure when the involvement is within the bony segment, should be regarded as judicious, and his experience in operations of this sort has been eminently satisfactory.

DR. J. P. CROZER GRIFFITH said, with regard to facial paralysis in early life, that the disease in his experience was certainly extremely uncommon. During seventeen or eighteen years of dispensary practice he had observed the condition very seldom. It is, of course, probable that more cases would appear in dispensaries devoted to diseases of the ear, since affections of this class were by far the commonest cause. This did not, however, apply to the instances developing in the new-born, where injury by instruments was undoubtedly the most common cause.

DR. W. G. B. HARLAND said that when the lesion is central it is, of course, on the side opposite to the facial palsy, whereas, when in the bony canal or peripheral part of the nerve it is on the same side. If the nerve is affected after its exit from the bony canal the paralysis is usually only partial, the forehead and eye escaping. Most cases of facial paralysis occur in older people, not in children.

DR. GRIFFITH said that he had seen a number of cases of intra-uterine amputations. He called attention to the fact that it was frequently combined with other pathological intra-uterine conditions. Quite recently, for instance, he had seen an imbecile child with intra-uterine amputation of one arm.

DR. ARTHUR VAN HARLINGEN showed photographs of a case of

MOLLUSCUM CONTAGIOSUM.

Catherine G., eleven months old, was brought to the out-patient department of the Children's Hospital last July. According to the mother's account, no one of the family or immediate neighbors, who were likely to come in contact with the infant, had previously shown any similar eruption. The present eruption began to appear some time in February last, about six months ago. The first lesion made its appearance on the ear and from time to time new ones showed themselves



DR. VAN HARLINGEN'S CASE OF MOLLUSCUM CONTAGIOSUM.

on the labia majora, on the chest, on the face, particularly about the mouth, on the hand and on the leg.

Very shortly after the development of the earlier lesions in the infant, the mother showed signs of the same affection, similar lesions developing upon the right cheek, the left breast and one lesion on the back of the neck. Up to the time she came to the

hospital none of the lesions had disappeared. New ones were being added from time to time.

When seen for the first time the appearances presented were those seen in the accompanying photograph. There were about twenty-five small tumors visible, half of which were about the mouth and on the face, and the remainder scattered over the surface generally. The smallest tumors were about the size of a pin's head, semi-globular in form, firm, smooth, shining and pearly in lustre. Each tumor was surrounded or covered by a minute network of blood-vessels. The larger tumors varied in size, probably according to their age, the largest being globular and nearly 1 cm. in diameter, somewhat flattened, rough on the surface as if opening out to discharge their contents. No sign of an opening was observed in any of them, but from one or two a slight warty outgrowth could be seen. The lesions were touched several times with nitric acid and have now about all disappeared, leaving little or no trace. To-day the mother called with a neighbor's daughter, ten years of age, who is accustomed to fondling the baby. She shows a typical lesion on the chin.

DR. MAURICE OSTHEIMER stated that among over 2,000 school children whom he had examined last year, only one case was found, and in that case there were but two lesions.

DR. FRANK C. KNOWLES had seen 2 cases in the Pennsylvania Hospital, but in neither case were there many lesions.

DR. D. J. MILTON MILLER asked how these cases were treated. He confessed that he had never seen a case.

DR. GRIFFITH referred to an epidemic of this condition at St. Vincent's Home several years ago.

DR. VAN HARLINGEN added that molluscum contagiosum was first described by Bateman, about 100 years ago. Later an idea arose that it was not contagious. But there is now no doubt of its contagious character, though the source of the contagion is not definitely settled. In a Paris hospital fourteen children developed the disease from one case. He has rarely seen so many lesions as in this case. In the treatment some authorities advise excision; he applies a caustic, such as nitric acid. In this case the application of nitric acid had proved quite efficient, only four lesions remaining out of the original twenty-five.

DR. HERBERT B. CARPENTER showed a girl of nine months with

INFANTILE SCURVY.

At birth, after normal labor, her weight was nine and one-half pounds. She was breast-fed until two months old, when she weighed seven pounds. Then she was given sterilized milk, one-third, with water two-thirds, for four weeks: this caused vomiting and loss of weight. The next food was condensed milk (one part to twelve parts of water) for three weeks; then Mellin's food; and five weeks later peptogenic milk powder; later Imperial Granum, until five months of age. She was never well, but did better on Imperial Granum than upon any earlier food. She did not gain weight, however, and lately began to lose again. About ten days before admission to the hospital, her ankles and legs suddenly swelled, and bleeding from the gums was noticed at the same time. The child cried when handled and would not sit up or even attempt to move arms or legs. Both knees were swollen and very tender, the swelling extending up the femurs. In the hospital she at once improved upon a suitable milk mixture, orange juice and beef juice. She shows very little scurvy now, although her gums still bleed.

DR. MILLER had seen the case when it entered the Children's Hospital. The swelling was so marked as to suggest osteitis of the femurs and had even been so regarded. The limb was exceedingly painful and swollen, extending almost to the upper epiphysis of the femur, and involving the upper end of the leg-bones. There was sponginess of the gums with some bleeding. The baby had been fed on a variety of foods, but had never taken fresh milk alone. It improved at once upon an unpasteurized milk mixture and orange juice. It had been discharged from the hospital before recovery, because the ward was closed on account of an outbreak of vaginitis.

DR. GRIFFITH said that he had seen in all about 40 cases of scurvy, mainly in consultation. In nearly all of the cases the attending physician had failed to recognize the disease. This he considers in no way a reproach to the ability of the attending physician. Although generally easy of diagnosis, the disease is extremely perplexing to one who has never seen it before. Thus it is often diagnosed as rheumatism, disease of the spine, etc. He

had repeatedly seen physicians when once the diagnosis was made wonder how they could possibly have failed to recognize the nature of the case. It is this element of newness in their experience which is accountable for this.

Writers in French pediatric journals have in the last few years been awakened to the occurrence of scurvy in that country. In seeking for the cause they have stated that the frequency of the disease in the United States depended on the prevailing use of commercial foods, among which they classify "modified milk." This shows how little the American system of infant feeding is understood in France.

As regards symptoms, it must be stated that by no means always is the classical combination discoverable. Some children will start with purple, swollen gums. Very frequently, however, the first symptom is pain, generally in the legs. This may, or may not, be associated with the involvement of the gums. In some instances, in Dr. Griffith's experience, hematuria has been one of the earliest symptoms, and sometimes the one symptom for a time. This, however, is less common.

DR. T. S. WESTCOTT said that to him one of the most interesting features of scurvy was the varying susceptibility manifested by different infants. Many other children could have been fed just as this child had been and yet not have developed the disease. If this were not true scurvy should be much more frequently encountered than it is. He instanced the case of a child under his care which had developed early scorbutic symptoms three times during its first year while being fed upon a peptonized mixture heated to 150° F. The symptoms had been anticipated and subsided each time within a few days under appropriate treatment. In another child which had had severe scorbutic symptoms when first seen, a second attack developed several months later, while taking a pasteurized milk mixture, despite the fact that orange juice had been given almost continuously since the initial manifestations.

DR. ALFRED HAND, JR., stated that he felt sure no member of the Pediatric Society would fail to recognize his first classical case of scurvy, as the disease had been brought to the Society's attention so often, but his experience was the same as Dr. Griffith's, though to a lesser degree, that unless a physician was on the watch for it in the bottle-fed children under his care, the first case

might be very puzzling to him. The physician in attendance on the last case seen by Dr. Hand gave a graphic description of the great tenderness that exists by saying that the child was "tender if you looked at him"; for these children know by experience that the slightest handling causes pain, and so they cry at the approach of any one.

DR. CARPENTER said that he had seen 4 cases during the summer. Most of his cases occurred in children with a poor digestion.

DR. HOWARD C. CARPENTER presented two brothers, eight and three and one-half years, with

MUSCULAR PSEUDOHYPERTROPHY.

Family History.—Paternal grandfather, age sixty-eight years, is living and well. Paternal grandmother, age fifty-eight years, is living and well. A paternal aunt died of tuberculosis. Maternal grandfather married a first cousin and died of tuberculosis at the age of twenty-five. Maternal grandmother also had tuberculosis; died at the age of forty-eight years; shortly before her death she became insane. A first cousin on mother's side has some nervous affection, the exact nature of which is not known. He is at present entirely helpless and his mind is in some degree affected. Father is living, of a nervous disposition. Physically his development is normal. He shows no signs of muscular pseudohypertrophy. The circumference of his calf, at the widest part, is 33 cm. Mother is living and well.

The two patients are the only children living. One other child, a girl, three years younger than the oldest boy, died of scarlatina. The older of the boys is eight years old; natural birth, at which time nothing abnormal was noticed. He weighed 10½ pounds. He was breast-fed for one year, then fed on Mellin's food and cow's milk. He was never sick until five years old, except for a mild attack of whooping-cough when two years old. At five he had bronchitis; when six a severe attack of double pneumonia. He also had measles and chicken-pox. When seven he had scarlatina, mumps following. He has had adenoids removed, and has been circumcised. His first tooth appeared at four and one-half months, he began to walk at nineteen months, and to talk when just past two years. He is rather backward at school, being still in the first grade. He speaks and writes well,

and is good at figures, but is a poor reader. When the child was one and one-half years old, mother first noticed that the calf muscles seemed unusually well developed; since that time his legs have steadily increased in size. It was not until last year, following the attack of scarlatina, that the mother noticed that the muscles of the back seemed over-developed. The only subjective symptom is weakness. The child has great difficulty in going upstairs, or in rising from the ground. His appearance is that of a well-nourished white boy, about eight years of age. The most striking feature of his appearance is the enormous development of the calf muscles; the size of his legs would seem normal for a child twice his age. His station is fair, his feet, as a rule, are not far separated, but there is marked lordosis of the lumbar spine. He has the characteristic gait of muscular pseudo-hypertrophy. Beside the great hypertrophy of the soleus and gastrocnemius, which are very firm on palpation, the quadratus lumborum and the supra- and infra-spinatus are also very much overdeveloped. On the other hand the pectoral muscles are markedly atrophied, and, to a less extent, the biceps, triceps, subscapularis, trapezius, latissimus dorsi, and muscles of the thigh. The sterno-mastoid and other neck muscles are not affected. Neither are the gluteal nor the hand muscles affected. The muscular power in the hands is weak. There is slight talipes equinus, but the heels touch the ground in walking. The head is normal in shape, but large. Pupils are dilated, but equal, responding to light and distance. A few teeth are beginning to show signs of caries. The tongue is large and greatly increased in thickness. The tonsils are hypertrophied and ragged. The external lymphatic glands are not enlarged. The bony chest is well developed, and there is no evidence of rachitis. The area of cardiac dullness is not increased. The apex beat is in the mammary line, 1 cm. below the nipple. The heart sounds are good, a soft, hemic murmur is heard at the base. The hands and feet are apt to be cold. The lungs are negative. The abdomen is prominent in the standing position, but not when the patient is in the recumbent posture. The abdomen is soft, the liver and spleen are not enlarged. The knee jerks are diminished on both sides. Babinski reflex not present. Kernig's sign is absent. There is complete extension and flexion at the knee and elbow joints. Sensation is normal; there are no fibrillary contractions or tremors. His measurements follow:

Circumference of mid calf, left.....	30	cm.
“ “ “ “ right	29½	“
“ “ “ thigh, left	33½	“
“ “ “ “ , right	33½	“
“ “ “ arm, left	16	“
“ “ “ “ , right	15½	“
“ “ “ forearm, left	16½	“
“ “ “ “ , right ...	16	“
“ “ “ abdomen at umbilicus..	53	“
“ “ “ chest at nipples	56	“
“ “ “ head	52½	“
Length of R. Lower extremity from ant.		
sup. sp. to the int. mal.....	57	“
Length of L. Lower extremity from ant.		
sup. sp. to the int. mal.....	56	“

The younger boy is three and one-half years old. Natural birth, weighing 10 pounds. Child was apparently normal at birth. He was breast-fed until one year old, then on Mellin's food and cow's milk. When one year old, he was very ill for two months, with what was probably diphtheria. He had chicken-pox when one and one-half years old, and a slight attack of measles when two and one-half years old. At the end of his second year he had scarlatina, with mumps following. He is mentally somewhat backward, and talks indistinctly. When asked a question, often, instead of answering, he will repeat the question. His first tooth appeared between the fourth and fifth month. He walked at eighteen months. He did not begin to talk until he was three years old. At about one year the mother first noticed that the child was not as strong as he looked, and since that time the weakness has been slowly increasing. The child goes upstairs on hands and knees. When rising from the ground he is obliged to climb up on himself. On examination he looks like a healthy white boy, about three years of age. Station is good, with the exception of slight lordosis. His gait is not normal, he shows a slight tendency to waddle. From inspection, his muscular development seems unusually good. His calf muscles are large and likewise the quadratus lumborum and supra- and infra-spinatus. He has very little wasting of the pectoral muscles, nor are the muscles of his arm atrophied. His head is large, but well shaped. The middle turbinates are hypertrophied, and the tonsils are very large. The tongue is clean and somewhat enlarged. The first

sound of the heart is murmurish at the apex. There are a few large moist râles at the base of right lung posteriorly. Abdomen is soft, liver palpable just below the edge of the ribs on right side.



DR. HOWARD C. CARPENTER'S CASE OF PSEUDOHYPERTROPHIC MUSCULAR ATROPHY. TWO BROTHERS, THE YOUNGER THREE AND ONE-HALF YEARS OLD, THE ELDER EIGHT YEARS OLD.

Spleen cannot be palpated. Knee-jerks diminished, especially on the right side. Kernig's sign absent. Babinski reflex absent. Sensation normal. Measurements follow:

Circumference of mid calf, left	22	cm.
" " " " , right	21½	"
" " " thigh, left	31½	"
" " " " , right	29	"
" " " arm, left	16½	"
" " " " , right	16	"
" " " forearm, left	15½	"
" " " " , right	15	"
" " abdomen at umbilicus	50	"
" " chest at nipples	55	"
" " head	50½	"
Length of R. lower extremity from ant. sup.		
sp. to int. mal.	40	"
Length of L. lower extremity from ant. sup.		
sp. to int. mal.	40½	"

DR. HAND said that this condition, like scurvy, is easy to recognize if it is borne in mind; but if not, then the first case might be puzzling for a time. He referred to the familial tendency of the disease, and also to the fact that in the last 3 cases that came under his observation no other member of the family was affected, although in each case there were several brothers and sisters in the family. He mentioned the superficial resemblance which the younger child exhibited bore to a cretin, with the prominent tongue, the slight collar of fat and the lordosis, but he believed that this was only superficial.

DR. GRIFFITH called attention to the fact that the pseudohypertrophy which characterizes the form of paralysis illustrated by the cases presented might, in a way, be called one of the accidental qualifications. That is to say, there is certainly a very close connection between the different types of muscular dystrophy, although in the pseudohypertrophic form it is true that the enlargement is the most apparent one; for eventually all cases reach a condition almost entirely atrophic. One case which he recalls, seen late in the disease, exhibited a most profound atrophy, except for an enormously hypertrophied tongue. In the early stages this had been a typical pseudohypertrophic case. In the "upper-arm type," too, a certain amount of hypertrophy is said to be present at first.

DR. CARPENTER added that these children had been taking thyroid extract without any effect.

Current Literature.

PATHOLOGY.

Hall, Geo., and Tribe, R. H. : Carcinoma of the Bronchus and Liver Associated with Glycosuria in a Youth. (*The Lancet*, April 1, 1905, p. 857.)

A boy of seventeen years was admitted to the University College Hospital, with cough, shortness of breath and loss of weight. The past and family histories were negative. He first noticed the cough about three months before admission and expectorated large amounts of bloody sputum. A month before he was admitted he began to complain of itching and developed an unnaturally great appetite and thirst. Then the amounts of his urine increased. A few days before admission his hands and legs began to swell. On admission he was pale, thin and cyanotic. Temperature 100.6° F. Both legs were covered with gangrenous purpuric spots. There were several edematous swellings on the trunk. The liver was enlarged. There was marked bronchial breathing. He had diarrhea. The urine was loaded with sugar and gave a faint reaction for diacetic acid. He died suddenly the day after admission. The bronchus of the lower lobe of the left lung was the seat of a columnar celled carcinoma. There were smaller areas in the upper lobe. The liver showed many large nodules with softened summits. There were small deposits in the retro-peritoneal glands and the posterior cervical glands.

Bernstein, E. P. : The Value of Lumbar Puncture: With Particular Reference to the Diagnosis of Tubercular Meningitis. (*Medical News*, June 17, 1905, p. 1,105.)

The author states that normal cerebrospinal fluid is colorless. This is also true of all abnormal conditions except inflammation of the meninges. In tubercular meningitis the fluid is clear but opalescent, and the depth of color in all cases depends on the number of cellular elements present. The fluid is alkaline and its specific gravity is about 1.005. In normal fluid no fibrin forms. In meningitis a fibrin net forms slowly. Albumin is present and is increased in disease. The normal fluid contains a substance that reduces Fehling's solution; this disappears in meningitis. All specimens of cerebrospinal fluid should be carefully centrifuged and examined. As a rule a mononuclear leukocytosis indi-

cates tubercular meningitis and a polynuclear leukocytosis, purulent meningitis.

All specimens should be examined bacteriologically, the entire specimen being centrifuged and the sediments examined. The agglutination test may be of value in the future. Inoculation of guinea-pigs is interesting but slow.

MEDICINE.

Hildesheim, O.: Epidemic Cerebrospinal Meningitis and Posterior Basic Meningitis. (*The Lancet*, May 20, 1905, p. 1, 332.)

The author reviews the bacteriological findings and concludes that: Even though a potentially pathogenic organism is found in the cerebrospinal fluid we cannot be certain that it is the cause of the disease. There are earlier accounts of posterior basic meningitis than of the epidemic disease. More than half the cases of basic meningitis are in infants under one year of age. The posterior basic cases run protracted courses, while the epidemic cases are acute. He finds no account in the literature of epidemic meningitis of amaurosis without optic neuritis, a remarkable feature of the basic form. Optic neuritis is common in epidemic meningitis and rare in posterior basic meningitis. Deafness is a rare sequel of posterior basic meningitis. Skin lesions are much less common in posterior basic meningitis than in the epidemic.

Monro, T. K.: Two Cases of Unilateral Convulsions and Paralysis in Young Subjects Associated with Exudative Erythema. (*British Medical Journal*, May 27, 1905, p. 1, 145.)

CASE I.—A boy, twelve years old, had a clear history except for rheumatism and the cigarette habit. On June 12th he had pains in his joints followed in a few days by a severe gastro-enteritis which lasted two weeks. At the end of this time he began to have right-sided convulsions. These occurred with diminishing frequency for two weeks. For the first five days he was unconscious, and he was aphasic for two weeks. He has still some facial paresis and his right arm is small and weak. On December 26th he developed an erythema nodosum which lasted until January 24th, leaving a conjunctivitis. On February 6th he had a second elevation of temperature and a large swelling appeared

on the outer aspect of his right jaw. This subsided after three incisions.

CASE II.—A girl aged eighteen had headaches for four days when she had two right-sided convulsions, followed by vomiting. The next day she had twenty-four convulsions in an hour and was continuously unconscious. She had missed her last menstrual period. For several days she had occasional convulsions and then her body became hyperemic. This soon turned to an erythema that lasted several days. Nine days after her first convulsion power began to return to her right side, but the headache persisted and she had a strabismus. She had an optic neuritis for some time.

The writer thinks that the agent that caused the convulsions in these cases caused the erythema.

Ham, B. Burnett: The Recent Epidemic of Infantile Paralysis. (*Australasian Medical Gazette*, May 20, 1905, p. 193.)

The author discusses the epidemic of infantile paralysis in Queensland, and contrasts the features of anterior poliomyelitis with those of meningitis. Epidemics of cerebrospinal meningitis are frequent and the mortality is high; with anterior poliomyelitis the epidemics are rarer, the mortality is slight, but the permanent injury is great.

The onset of cerebrospinal meningitis is with headache and low temperature, followed by a tonic contraction of the muscles. In infantile paralysis, on the other hand, the onset is sudden, with high fever and a flaccid paralysis, vomiting, diarrhea, and sometimes convulsions. In anterior poliomyelitis the paralysis is much more extensive on the first day or so than later in the disease. The specific organism causing anterior poliomyelitis has not been found.

The pathology is an acute inflammation followed by degeneration in the region supplied by one of the branches of the artery of the anterior median fissure and simulates the conditions found after thrombosis in the brain. The most frequent site of the lesion is the lumbrosacral region. The prognosis is good, as to life, but bad as to complete recovery. The disease should be treated at the onset with the nitrites to lower the blood pressure in an attempt to reduce the amount of inflammation. Later, muscle massage and training are necessary.

SURGERY.

Brewer, Geo. E.: A Case of Tracheal Stenosis from Papilloma. (*Medical News*, Feb. 11, 1905, p. 256.)

A boy of eleven years had extensive papillomatous disease of the larynx that progressed so rapidly that a tracheotomy was performed. After the laryngeal growth was removed the dyspnea returned when the tube was removed. Some time later an incision was made from the body of the hyoid bone to the sternum. A new tube was inserted and the larynx and trachea were opened by a median incision. Cocaine and adrenals were at once applied to the mucous membrane. A large papillomatous mass was found just above the old tracheal opening. This was removed. A large rubber tube was placed in the trachea through the mouth. The cannula was removed after thirty-six hours. Recovery was rapid and complete.

Cheesman, W. S.: Empyema Treated by Perthes' Method. (*Journal of the American Medical Association*, May 20, 1905, p. 1,611.)

The author reports a case which had been operated on for a very severe empyema. The drainage tube was lost in the wound. He resected a rib and inserted a tube, attached by means of a flange (a bicycle flange stem) to a rubber clamp. This tube was attached to a dentist's saliva pump with a large bottle interposed to catch the discharge. The suction was obtained from a faucet. The cavity, which had not diminished in size for six weeks, was obliterated in seven weeks and the patient was soon able to work.

Stern, W. G.: A Successful Method of Treating Fracture of the Femur in Infancy. (*New York and Philadelphia Medical Journal*, May 20, 1905, p. 992.)

The author states that fracture of the femur in infants is usually caused by efforts of extraction. He bundles the child up in a pillow for the first three days to prevent disturbing the mother. Then after cleansing the skin with ether he applies zinc oxid adhesive extension straps well up over the trochanter. These he covers with a flannel and oiled silk dressing. The child is laid on a cushion and a cord, attached to a weight, passing over a hook in the ceiling, is applied to the straps to exert vertical extension. This provides an extension that allows nursing, changing the

clothes, and free movement of the child, and is comfortable. The straps can remain in place for the entire period if they are first sterilized.

HYGIENE AND THERAPEUTICS.

Horder, T. J., and Scofield, H. C. L.: A Second Case of Pneumococcus Endocarditis Treated by Antipneumococcus Serum. (*The Lancet*, May 20, 1905, p. 1,333.)

A boy, aged ten years, had enlarged tonsils and a slight sore throat. A few weeks later he developed an acute rheumatism, with a mitral systolic murmur. The joint pains passed off under salicylates, the temperature being normal on the eleventh day. On the thirteenth day he had pleurisy, with lung consolidation on the right side. This passed off by lysis, but left an empyema, for which a rib was resected. The irregular temperature continued and a left-sided empyema was opened. The fever persisted, 102°-103° F. The mitral murmur was still present. Pulse 140. The blood showed leukocytes 11,600 and gave a good pneumococcus culture. On three consecutive days 2 c.c. of Pane's serum No. 2 were given hyperdermatically, repeated two days later. Nephritis set in in two days and the patient died on the sixty-sixth day of his illness.

Selbert, A.: Rectal Injections of Large Doses of Sodium Salicylate in Cerebrospinal Meningitis. (*Medical Record*, June 17, 1905, p. 930.)

The author reports 5 cases in which he administered sodium salicylate per rectum, with marked and immediate amelioration of the symptoms and an early recovery. He gives 15 grains dissolved in a pint of warm water as a rectal enema. This is retained by lateral compression of the buttocks. The dose should be repeated every six hours till from 500 to 800 grains have been given. Any rectal irritation calls for a further dilution of the drug. The bowels should be washed with a large, high enema of water every twenty-four hours. The author finds this treatment as effective in lingering cerebrospinal meningitis as in acute, but states that it is of no avail in the tubercular form.

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Original Communications.

CONGENITAL LARYNGEAL STRIDOR—A CONTRIBUTION TO THE PATHOLOGY OF THE AFFECTION WITH REPORT OF AN AUTOPSY ON A CASE.*

BY HENRY KOPLIK, M.D.,
New York.

Congenital laryngeal stridor is a peculiar symptom complex which has long been a matter of investigation and speculation. The symptoms are admitted by all to be connected with the larynx and not allied to other conditions simulating it in which the structures of the nasopharynx are involved. Laryngeal stridor is a peculiarity of respiration which appears or is noticed shortly after birth. The infant otherwise may be in apparent health; as the infant lies quietly in its crib or sits in the arms of the nurse a peculiar crowing or grunting sound is heard with inspiration. This sound may be scarcely audible, or it may be heard at some distance, as across the room and of a loud sawing timbre. As a rule, the sound is heard only with inspiration, but may in severe cases be present during expiration, also. At times in the mild cases the grunting sound becomes inaudible, but reappears at intervals. These infants, if they are caused to cry or become excited, may at the end of inspiration develop a piping noise similar to what is heard at the termination of an attack in laryngismus stridulus.

Though many of these infants are rachitic, because some of them are bottle-fed, they are not all so, for I have seen infants breast-fed and free from all signs of rachitis who presented the above symptom complex. Nor do these infants necessarily present the Chvostek sign or any of the marks of "latent

* Read before the Seventeenth Annual Meeting of the American Pediatric Society, June 19, 1905.

tetany," so-called, nor do all of them have so-called apneic attacks, although recently a case came under my observation—a newborn baby—which presented laryngeal stridor and apneic attacks. The picture, therefore, is a definite one, not necessarily merging with so-called convulsive respiratory conditions, such as laryngismus or apnea, common to infancy and childhood. Laryngeal stridor must not be confused with another condition which is commonly met with in the newborn and in older infants and children. In this state there is noisy breathing, more or less marked, which dates from birth, but which is distinctly due to an adenoid obstruction in the nasal passages. These infants make a snoring noise, either when nursing or in undisturbed respiration, but the noise is distinctly posterior nasal in its origin. In these cases, as in laryngeal stridor, there may be a retraction of the lower part of the sides of the thorax and of the suprasternal notch in inspiration. These infants are distinctly lymphatic, but the cases of laryngeal stridor are not necessarily so.

In laryngeal stridor there may be inspiratory retraction of the suprasternal notch, though this is not always the case. The most marked cases I have seen had no inspiratory retraction.

The affection appears soon after birth; hence the term "congenital"; and may extend well into the period of childhood. Much has been written upon this affection, and confusion has been caused by the introduction of the term "thymic asthma" into its nomenclature. If the literature upon "thymic asthma" is sifted it will become apparent that all varieties of spasmodic respiratory conditions of infancy and childhood have at one time or another been grouped under this term. Laryngismus and apnea have been grouped as "thymic asthma." In other words, "thymic asthma" has been utilized to include spasmodic or convulsive respiratory conditions, in which the thymus was supposed, on account of its enlarged or distended condition, to exert some disturbing influence. The thymus has also been held to be a casual factor in the production of laryngeal stridor. It would be well were the term "thymic asthma" dropped, inasmuch as in all the conditions with which the thymus has been linked in the nomenclature of thymic asthma there is scarcely any so-called asthmatic condition present, but rather something outside of the lung proper as an *etiological* factor.

The *symptoms*, also, as far as the physical signs are concerned,

do not draw the lungs into the picture, affecting only secondarily the rhythm of the respiratory act.

This brings us to a consideration of the various theories which have been elaborated to account for the production of "laryngeal stridor." The first theory is, that the symptom complex is caused by a congenital malformation of the larynx and epiglottis. This malformation is congenital, and consists not only in an abnormally narrow glottis opening, but the epiglottis is so disposed that its sides are rolled up and almost in contact, and the aryepiglottic folds draw the tip of the epiglottis downward and backward, covering the superior opening of the glottis. Thomson has shown, as has also Luschka, that the infantile epiglottis is gutter-shaped, and it is only at the tenth year of life that this infantile type of epiglottis is lost and the adult type substituted.

In the cases of laryngeal stridor in which a postmortem has been obtained, the above abnormal anatomical condition was present. One of the first cases published was that of Lees, in which the child had suffered from laryngeal stridor and died of intercurrent diphtheria. In this case the aryepiglottic folds were apposed so that the epiglottis covered the larynx and a mere slit-like opening of the epiglottis was seen and through this breathing took place. A second case of laryngeal stridor in which autopsy was obtained was that of Refslund. This was the case of an infant two and one-half months of age, dying of intercurrent pneumonia. Here the larynx resembled closely that of the case of the present writer, whose case also died of intercurrent pneumonia, and in which the lateral borders of the epiglottis were apposed so as to form a mere slit which closed in the superior opening of the glottis and through which respiration took place.

The third autopsy obtained was a case of Variot in a child twenty-two months of age, dying of scarlet fever. In this case the stridor had existed from birth and there was an epiglottis deformed, though to a lesser degree than in the two preceding cases. Thus, in those cases of laryngeal stridor in which an autopsy was obtained there existed a distinct anatomical malformation of the epiglottis and superior opening of the glottis or larynx quite sufficient to account for the symptoms, and in one case the infant was two and one-half months old (Refslund), so that there could in this case at least be no question as to a postnatal factor in the production of the marked deformity.

Recently, Thomson and Turner, of Edinburgh, have taken up the subject of laryngeal stridor and elaborated a theory in which the "primary element in the causation of this condition is a disturbance of the co-ordination of the respiratory movements, probably due to some developmental backwardness of the cortical structures which control them." In their monograph, the authors have shown that the infantile epiglottis has a tendency to gutter-shaped formation, and any disturbance of the rhythm of respiration would intensify the tendency of the lateral aryepiglottic folds to curl the sides of the epiglottis toward the median line, thus producing the malformation seen postmortem in cases of laryngeal stridor. Their theory is a combination of the nervous element with the anatomical deformity as a sequence of this nervous incoordinate breathing. These authors took the larynx of newborn infants and actually produced by means of suction on the trachea below the larynx a condition of the epiglottis closely simulating the anatomical condition found by Lees, Refslund and Variot. Thomson and Turner surmise that the anatomical deformity of the epiglottis found in the postmortems of cases of laryngeal stridor was caused by the prolonged action of the irregular respiration, as shown in their experiments. However this might appeal to us by its ingeniousness, the theory does not account for the cases like that of Refslund, in which the larynx was inspected two and one-half months after birth, scarcely time enough to have effected such marked anatomical changes as were seen in this epiglottis postmortem. Recently, the thymic origin of laryngeal stridor has been presented by Avelis, and more enthusiastically by Hochsinger. Hochsinger, by means of X-ray pictures, established to his satisfaction an enlarged thymus in some 23 cases and in these cases laryngeal stridor was present. Hochsinger even goes so far as to revive the term "thymic asthma." This theory is not supported by anything but clinical life study of cases. In addition to the X-ray, Hochsinger has made a study of the percussion of the thymus, and has, to his mind, verified the organ as enlarged, thus confirming the X-ray pictures.

We will not attempt at the present day to analyze the data of Hochsinger, which may or may not be confirmed by future studies. It is our object to record a case unique in itself and one of exceedingly rare occurrence. The case occurred in my hospital service and died there while presenting the symptoms of an exag-



Posterior view of the epiglottis and larynx in Dr. Koplik's case of laryngeal stridor. The epiglottis curves back over the larynx; the aryepiglottidean folds are closely approximated, so that the whole superior opening of the larynx is covered in by the gutter-shaped epiglottis.

gerated form of laryngeal stridor. The exaggerated symptoms occurred in connection with the dyspnea caused by the pneumonia from which the child suffered. The autopsy, which was complete, enables the author to add evidence to the anatomical theory in the causation of the symptom complex of laryngeal stridor.

W. H., male, one year, the youngest of eight children. No history of miscarriage in the mother; parental history negative. Baby partly breast-fed. When six months of age had bronchitis; baby could sit up and say mamma and papa. Has no teeth and has signs of slight rachitis. Weighs eighteen pounds.

Since the age of three weeks, the parents have noticed that the breathing was noisy and that there was a crowing noise with the breathing. The child has been taken on this account to many clinics. At the age of five months the condition became more marked or worse and has persisted up to the time of the present illness.

Present Illness.—Ten weeks ago infant became ill with an attack of convulsions, following which there came fever and a discharge from the left ear which lasted a short time; since then the child has not been well; for the past two weeks child has been quite ill and the breathing rapid and with crowing character. There were several convulsions during the illness. There has been a cough, followed at times by vomiting.

Status.—On admission, the child appears to be well nourished; no teeth; signs of slight rachitis. There are heard on entering the room loud, noisy crowing or sawing inspiratory and expiratory sounds; otherwise child is not suffering from cyanosis or signs of laryngeal stenosis. There is little, if any, retraction of the supra-sternal notch, though there is great retraction of the diaphragmatic groove. The noisy crowing respiration is the prominent feature of the case and can be heard across the room. There are sudamina on the body. Nothing in the fauces, but an attempt to look into the fauces is always followed by a stoppage of respiration and a loud inspiratory crow similar to that which is heard in laryngismus stridulus.

Thoracic Signs.—The loud breathing is heard over the chest, but there are distinct dullness, crepitant râles and increased vocal resonance at right base of the lung. There are also patches at the left apex and right apex behind of dullness, with crepitant râles. The remainder of the examination negative. A stethoscope

placed over the larynx confirms the supposition that the crowing sound is laryngeal.

Diagnosis.—Congenital laryngeal stridor. Acute disseminated bronchopneumonia.

Subsequent History.—The crowing stridor continued, the frequency of the respirations increased from 58, which it had been, to 70 a minute, the pulse 130—temperature ranged from 103° to 105° F., and the child died in convulsions with increasing signs of dyspnea, cyanosis and heart failure, twenty-four hours after admission to the hospital.

Autopsy revealed the lungs to be the seat of extensive disseminated bronchopneumonia, the right lung being most affected in its lower lobe. The thymus was large and weighed 25 grams. The epiglottis and larynx showed that the child had a condition exactly similar to the cases of Lees and Refslund. The epiglottis was curved backward and lay over the superior opening of the larynx. The lateral borders of the epiglottis were in contact, leaving a slit which varied from half a millimeter in its greatest extent from the tip of the epiglottis to a millimeter and a half at the arytenoid cartilages, where the space between the aryepiglottic folds was a little wider than above. The aryepiglottic folds were almost in contact and were thin and membranous. The larynx was slit open and presented nothing pathological, except that before the larynx was split open an attempt to introduce the smallest size one-year intubation tube into the box of the larynx between the cords could not be carried out without great force, and this was not attempted for fear of injuring the tissues for future study. The opening of the larynx, therefore, was narrower than normal. There was no membrane, no inflammation, or swelling, no cicatrices, either above, on or below the cords.

There are points of interest about this case which must be emphasized. The diagnosis was not difficult. Both the laryngeal condition and the condition of the lung were correctly surmised by the author before death. The peculiar breathing, though exaggerated and accelerated, was classically like that of many cases of stridor which had come under his notice.

A careful percussion of the thymus during life failed to give any positive data and still the thymus was found large postmortem. The enlarged thymus would no doubt be looked upon by some as corroborative of the thymus theory in its influence in the pro-

duction of the symptom complex of laryngeal stridor. It must not be forgotten, however, that the thymus in this case in no way was demonstrated to press on the trachea and that the anatomical conditions of the larynx and epiglottis fully accounted for the production of the stridor. The thymus in the author's experience is found to be enlarged in many diverse conditions. In his studies on the thymus, made in conjunction with the Jacobi monograph on the subject, the thymus was found as heavy as 30 grams in children who had met death under the most diverse conditions, including pneumonia. Enlargement of the thymus is, therefore, not an uncommon postmortem finding. During life, also, many lymphatic children no doubt have an enlarged area of dullness over the thymus, or an x-ray may show an extended shadow, and yet it would be difficult to say whether such a thymus is not rather the result of, than the cause of, the pathologic state of the patient; we know very little of the function of the thymus. Why multiply the diseases traceable to its enlargement without at least an inkling of its function?

Laryngeal stridor may occur in conjunction with a large thymus, but if there coexist such marked distortion anatomically of the epiglottis and larynx, as in the cases of Lees, Refslund, and that of the author, it would be going out of our way to draw the thymus into the picture. The theory of Thomson and Turner also needs more confirmation in view of the fact that in four consecutive autopsies, Lees, Refslund, Variot and that of my own case, the anatomical anomalies are fully sufficient to account for the symptoms. Until an autopsy reveals a perfectly normal larynx and epiglottis in a child in whom laryngeal stridor coexisted during life with a large thymus, we would be unwilling to entertain either the thymus theory or the theory of nervous incoordination of Thomson and Turner in its production.

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DISCUSSION.

DR. MORSE.—I would like to mention in this connection a case symptomatically like congenital stridor that I saw last winter. An examination showed that the larynx and vocal cords were normal and we thought we made out an enlarged thymus. It seemed apparent that death would result unless something was done. Dr. Murphy, therefore, removed a piece of the sternum

and pulled up the thymus. When the thymus was pulled up the breathing immediately became better, but became difficult again as soon as it was allowed to fall back. The thymus was then stitched up into place. The symptoms recurred in a few days, however, and the child died of general weakness. I think that this is the first time that this operation has been deliberately undertaken for the relief of dyspnea supposedly due to hypertrophy of the thymus.

DR. GRIFFITH.—I think I recall reading the history of a case, perhaps not of the same nature as Dr. Morse's, in which the thymus gland was elevated in order to relieve the pressure of it upon the trachea.

I do not know whether Dr. Koplik means to include his case in the group known as thymic asthma; I suppose not. Writers seem disposed to divide cases of laryngeal stridor and spasm of the larynx into several groups. First, those due to lymphatism, of which the enlarged thymus is a symptom only rather than the cause. It is questionable in these cases whether the apparent laryngospasm is really such, or is an evidence of heart failure. Second, stenosis in which an enlarged thymus gland produces the symptoms by pressure. Cases of this kind are certainly quite unusual. Third, the cases of congenital laryngeal stridor, which are certainly distinct from the other two forms.

DR. MCCOLLOM.—I have been very much interested in this specimen because it shows that we cannot tell what difficulty we shall meet when we attempt intubation. I also want to say that in the majority of cases of laryngeal diphtheria we shall get negative cultures. That is an important point because we must not wait for positive cultures in those cases; the membrane is so far down that we cannot reach it with the culture wire. I emphasize this because I have had so much difficulty to make physicians understand that we must not wait for positive culture reports. Bacteriology is all right, but it must not entirely rule the clinician.

DR. LA FÉTRA.—In regard to the pressure of the enlarged thymus upon the trachea, most of the cases carefully studied show that the thymus does not make any pressure upon the trachea itself. There have, on the other hand, been a few cases examined where it was shown that the trachea was deformed or flattened by the pressure of the thymus gland. In these cases the dyspnea ceased when more room was made for the thymus.

DR. ABT.—I would like to ask Dr. Koplik whether this is an unusually heavy thymus. It seems to me I have seen glands as heavy as that which cause no symptoms whatever. If I remember properly, it is said in the Gerhardt Handbuch, in the Jacobi article, that a thymus of 30 grams may exist without causing any symptoms.

DR. KOPLIK.—That is correct, and you may remember that I myself weighed those glands for Dr. Jacobi. In regard to the point made by Dr. Griffith, I agree with him that the word thymic asthma should be held in abeyance until we can prove the pathologic nature of the condition. I am inclined to believe this thymus had little to do with the condition, for you find as large thymus glands in children who die of pneumonia and other diseases but who have never had laryngeal stridor.

Hypertrophy of the Fetal Thyroid.—W. E. Fothergill (*Jour. of Obstet. and Gyn. of the Brit. Emp.*, January, 1904) reports a case of hypertrophy of the fetal thyroid with maternal eclampsia. The case is an example of the use of thyroid in the management of eclampsia and as being one of five recorded instances of hypertrophy of the fetal thyroid following the administration of potassium chlorate to the mother during pregnancy. The patient was a stout woman, thirty-seven years of age, of gouty ancestry. She had suffered from repeated abortions, and during the pregnancy in question potassium chlorate was given on the hypothesis that the abortions had been caused by placental thrombosis. Slight swelling of the hands and feet occurred in the eighth month of pregnancy, and 0.2 per cent. of albumin was found in the urine. The patient was ordered to rest, to have vegetarian diet, and to take 10 gr. of thyroid substance daily. The condition improved, but later, after an unsuitable meal, headache and vomiting set in. Anuria followed, and the patient finally had two prolonged eclamptic seizures and became comatose. The anuria persisted for two days after the seizures; on the first day nine 5-grain tabloids of thyroid were given, and on the second seven tabloids. Urine was then passed. Labor began on the following day, a small female child being safely delivered. The child was alive at birth, but died after a few minutes from the presence of a large solid tumor, comprising the whole thyroid gland. The mother suffered from complete anuria for twenty-four hours after delivery, and took during this time 30 grains of thyroid. She then passed urine and her condition steadily improved, becoming normal in a few days. After his experience in this case the author would give thyroid substance an extended trial in the auto-intoxications of pregnancy. On examining the fetal tumor all the elements of the thyroid were found to be hypertrophied and the gland to be about seventeen times heavier than normal. The conditions under which hypertrophy of the fetal thyroid followed the administration of potassium chlorate to the mother in five instances are not understood.—*British Medical Journal.*

NOTES OF A CASE OF ACUTE LEUKEMIA.*

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Although numerous cases of acute leukemia in childhood have been reported, and the subject itself has recently been discussed at length by members of this Society, the affection is still sufficiently rare and obscure to demand that a careful record be made of each case. The notes of the following case, which appears to us to possess features of special interest arising from its abrupt onset and extremely rapid course, we think desirable to place on the records of this Society:

A. M., a lad of Jewish descent, aged fifteen, born in Chicago, but living in Montreal for the past three years, was admitted to the Montreal General Hospital on June 4, 1904. On May 29th, seven days previously, he was awakened in the morning by a profuse epistaxis, which continued all that day and part of the next. There had been no injury and his parents could assign no cause. The day previously, the 28th, he had been at school and was stated by his parents to have been in good health and his skin of a normal color. He was bright, played with his friends as usual, and went to bed, as far as they knew, in perfect health. On two or three previous occasions he had suffered from bleeding at the nose, but each of these attacks had been promptly stopped with simple remedies. Otherwise he had always been healthy, except for an attack of mumps. His diet, so far as could be learned, was wholesome. The portion of the city in which he lived is one of the most healthy, being comparatively close to the mountain. The family history is an unusually good one with no tendency to hemophilia in any of its members.

The epistaxis, which had continued all through the day of the 29th, and part of the 30th, had recurred on the 31st and had been checked by plugging the nares with gauze. On June 1st he began to bleed from the mouth, and a continuous oozing from the mucous membrane of gums and of both cheeks had persisted until the time of his admission. Ecchymotic spots had also appeared

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on the lower extremities. On June 2nd vomiting and diarrhea had set in; the vomitus contained blood, but there had been no melaena or hematuria. Headache was complained of and vertigo, with shortness of breath on any attempt at movement.

When seen in the hospital he was in a very restless state, tossing from side to side on the bed; mentally, he was dull, but could be roused to answer questions. The rectal temperature was 101°F., pulse 132 and respirations 32. Examination showed him to be a fairly well nourished boy; the skin, mucous membranes and conjunctivæ showed a marked degree of anemia; petechiæ, varying from 1 to 5 mm. in diameter, were scattered over the trunk, and more numerous on the extremities, especially on the legs below the knees where several large ecchymoses were also to be seen. There was no edema. The nares were plugged with gauze. Petechiæ were visible on the buccal surface of the cheeks and there was a continual oozing of blood from the edges of both gums. The tonsils were slightly enlarged and the breath was foul-smelling. The joints were normal. Marked tenderness was elicited by pressure over the sternum, but over no other bone. There was a moderate discrete enlargement of the superficial lymph glands, the anterior and posterior cervical, the axillary, the epitrochlear and the inguinal were easily palpable, but tenderness in them was not elicited by pressure. The respirations were slightly increased in frequency, but examination revealed no abnormal conditions in the lungs. Transverse cardiac dulness measured 7 cm.; there was a slight systolic murmur at base. Blood pressure registered 120 mm. by the Riva Rocci apparatus.

The abdomen was distended, especially in the upper zone, and the outline of the enlarged spleen was distinctly visible. On palpation the lower margin of the liver was easily felt 6 cm. below the costal margin in the nipple line and tenderness was elicited on pressure over it. The spleen was distinctly palpable and its resisting border could be felt 6.5 cm. from the median line and 6 cm. below the costal margin.

Hearing appeared to be normal. Vision in the right eye was blurred. An examination of the field of vision was impossible on account of the patient's condition and unfortunately no examination of the fundi was made.

The urine was somewhat turbid, its specific gravity 1.012; it was acid in reaction and contained neither albumin nor sugar. Under the microscope only a few leukocytes were to be seen, but no blood cells, no casts, and no uric acid crystals.

An examination of the blood made immediately on admission by Dr. Patterson, to whom we are also indebted for many of the notes, showed the erythrocytes, 1,620,000; leukocytes, 34,000; hemoglobin, 35 per cent.; clotting was normal.

The lad's condition became rapidly worse. Numerous loose movements with no evident signs of blood in them occurred. He vomited all nourishment taken. The petechiæ and ecchymoses increased in number and in size; vision was lost in the left eye on the morning of the 6th. Death took place the same evening.

A second blood count made on the morning of the 6th showed:

Erythrocytes	1,390,000		
Leukocytes	91,600		
Large Lymphocytes.....	45.5	per cent.	
Small Lymphocytes.....	34.5	"	"
Polymorphonuclears	12	"	"
Myelocytes	3.0	"	"
Transitionals	4.2	"	"
Eosinophiles .....	.8	"	"

The small lymphocytes were quite normal, the nuclei of the larger ones were perhaps more granular than usual. In a count of 500, three nucleated cells were seen. A culture from blood taken at the same time was carefully made by Dr. Gillies, but proved negative as the tubes showed no growth after forty-eight hours.

AUTOPSY.—The autopsy was performed by Dr. Gillies sixteen hours after death. The body was that of a well nourished boy; postmortem rigidity was present, also postmortem lividity over the dependent parts of the trunk. The skin was of a pale lemon tint showing over the abdomen, chest, legs and arms numerous petechiæ, and over the lower extremities, large purpuric patches. The external genitals were normal, the pupils equal and the gums were covered with clotted blood.

On opening the abdomen the peritoneum was seen to be glistening; the liver was seen exposed for one hand's breadth below ensiform cartilage, and the spleen reached the costal border at the level of the ninth left costal cartilage. On removing the sternum the thymus gland was seen to be enlarged.

The pleuræ, lungs and pericardium were normal. The *heart* was slightly enlarged, and its muscle pale. Lying beneath the visceral pericardium, on the anterior surface of the ventricles, close to the septum, were seen numerous fairly large ecchymoses. The

spleen was large, its weight 430 grams; its capsule was slightly wrinkled; its consistency increased. On section, the organ cut firmly and presented a somewhat mottled color, varying from a dark brownish-red to a dark yellow; the Malpighian bodies showed distinctly on the dark background. The *right kidney* was of normal size; its weight 100 grams; its color pale; the *venæ stellatæ* were prominent. The capsule peeled off readily from the surface of the organ, showing several whitish areas, not raised above the level of the surrounding kidney substance, and of varying size. On section, the cortex and medulla were seen to be of a pale yellowish color, and scattered over the cut surface were irregular whitish masses, similar to those seen on the outer surface of the organ. The pelvis was normal. The *left kidney* presented the same general appearance as the right, but the whitish masses were fewer in number. The *suprarenals* were normal. The *liver* was slightly enlarged, its color brownish-yellow, its weight 1,330 grams, its capsule smooth, its edges sharp and its consistence normal. On section the color was yellowish and the lobules somewhat indistinct; the parenchyma was friable. Scattered over the cut surface were seen yellowish-white masses, which were less distinct and smaller than those in the kidneys.

The stomach was somewhat dilated and showed submucous ecchymoses. In the duodenum, immediately beyond the pylorus, was seen a localized infiltration of the walls resembling a tumor 3 cm. in breadth. The surface was elevated and the mucous membrane eroded. The lymph follicles throughout the small intestine showed hyperplasia and the Peyer's patches were much enlarged. The colon was normal. The pancreas was normal. Behind the pancreas was a large mass of swollen lymph nodes, of firm consistence, one node being nearly as large as a small lemon. The edge of the mass extended as far as the site of the eroded area in the duodenum. Some of the nodes in the mass were of a reddish hue, while others were whitish and firm. The mesenteric lymph nodes were swollen and soft, as also were the inguinal, the axillary and the cervical nodes. The rectum was normal. The testicles were normal. The thymus was enlarged, soft and gelatinous on section; the thyroid colloid. The larynx and trachea were normal. The esophagus was normal. The abdominal aorta was smooth and elastic.

MICROSCOPICAL APPEARANCES.—The duodenum, in a specimen taken from the tumor-like swelling immediately beyond the

pylorus, showed an infiltration of large round mononuclear cells into the mucosa and submucosa between Brunner's glands. The cells were not granular and among them might be seen a few small mononuclear cells resembling small lymphocytes. The normal tissues of the gut in this section seemed little disturbed by the presence of these cells. A section at the level of the tumor, however, presented a different microscopical picture. Here all signs of the normal structures were lost, except in the neighborhood of the outer edge of the tumor where a few strands of muscular fibres were seen passing in among masses of mononuclear cells. The cells presented no definite structural arrangement; in places a reticulum could be made out about each cell, but in other places the reticulum was lost and the cells were massed together and held in place by a coarser mesh. The blood vessels were poorly developed. The microscopical appearance resembled that of a lympho-sarcoma. The mucosa was completely absent from the surface of the tumor.

The capsule of the spleen was seen to be somewhat thickened, the parenchyma everywhere showed marked hyperemia, the sinuses being distended with blood cells. The Malpighian bodies were enlarged and showed a general infiltration with mononuclear cells of a uniform type, in which the nucleus was relatively large and the protoplasm clear.

The liver cells in general stained well and the nuclei were clear and distinct, but in many there were evidences of fatty change. In many places about the portal vessels were to be seen collections of mononuclear cells; masses of these cells were also scattered irregularly throughout the lobules, leading in some places to the complete disappearance of the liver cells. It was possible to trace in places the various stages from that of slight compression of the liver cell to that of complete replacement, the stage depending upon the number of newly formed mononuclear cells. In some instances atrophying liver cells could be seen within a mass of these round mononuclear cells.

The kidney showed the cells of the glomeruli distinct, with clear staining nuclei. In the convoluted tubules the cells were somewhat swollen and the nuclei indistinct, but in other parts the cells stained clearly. Throughout the section masses of well stained mononuclear cells were to be seen forming the whitish masses visible to the eye on section. In some places these compressed the normal tissues about which they lay, and in other places replaced them completely. Where the new-formed cells

were few in number no change could be detected in the pre-existing structures.

The mesenteric, retroperitoneal, cervical and axillary lymph nodes all presented the same microscopical appearance. Among the ordinary cells of the lymph nodes were to be seen numerous large mononuclear, non-granular cells. In some of the retroperitoneal nodes polynuclear cells were also present. The structure of the lymph nodes was preserved.

The bone marrow showed myelocytes, both neutrophile and eosinophile; also red blood corpuscles, both nucleated and non-nucleated. The large mononuclear lymphocyte predominated all other white cells, and in comparison to it all the other white cells were relatively few in number.

This case, both in its clinical symptoms and its anatomical findings, is, we think, to be regarded as a typical example of acute lymphocytic leukemia, as recognized at present. It began, as many of these cases do, abruptly with hemorrhagic manifestations. Close cross-questioning of both parents and the lad himself revealed no indication of ill-health in the boy previous to the initial epistaxis, except that in answer to a leading question the lad said that after running he had perhaps felt a little out of breath for the past three weeks. It had not, however, interfered with his games. Counting from this initial epistaxis the course of the disease was just ten and a half days. The case in this respect is therefore especially interesting, for so far as we have been able to investigate the subject, the cases which have ended fatally in twelve days, or less, may be counted on the fingers of one hand. Litten¹ would seem to hold the record, his case lasting only four and a half days. Nobel² reports one the duration of which was ten days. Greiwe's³ case lasted eleven days, and those of Englisch⁴ and Obrastzow⁵ lasted twelve. McCrae⁶ also reports a case in a lad of fifteen years, which ran its course in about twelve days.

The question is an interesting one as to what the exact condition of the lymph nodes and blood in this lad was immediately preceding the hemorrhage. While there was nothing in his appearance or in his behavior to attract the attention of his parents, who were rather above the average of their class in intelligence, we recognize that in a certain number of cases a latent stage commonly known as the aleukemic stage exists, and it is possible that a careful examination at that time might have revealed some deviation from the normal.

Dr. Thos. McCrae,⁶ in speaking of 5 cases that occurred in the Johns Hopkins Hospital, gives as the average of their blood count on admission: Hemoglobin, 35.4 per cent., red cells, 1,822,000, and leukocytes, 104,000. In the case we have just reported the hemoglobin was 35 per cent., the red cells 1,620,000, and the leukocytes 34,000 (1—48); but in thirty-six hours the leukocytes had risen to 91,000 (1—15); at the same time the large lymphocytes were greatly increased, the polymorphonuclears were diminished and myelocytes were present.

Dr. McCrae considers that in acute leukemia we have to recognize in addition to what may be called the specific leukemic features, grave changes in the red cells themselves, suggesting that in acute leukemia, in addition to the changes in the white cell count, we have to deal with a very rapid and severe anemia of the primary type. Nevertheless, he admits that in the majority of cases, and especially in rapid cases, there is very slight variation in the red cells in size, shape and staining. In the present case there was almost no poikilocytosis and no polychromatophilia. A careful recount showed a few nucleated red cells with no mast cells; the character of the staining was extremely uniform.

According to Pinkus,⁷ of Berlin, children are attacked with relative frequency. This must hold true of the second rather than of the first decade. Of 45 cases recorded by Theodor,⁸ 6 occurred in the first decade and 5 between the ages of ten and fifteen years; and in 56 cases collected by Fussell,⁹ Jopson and Taylor, 9 were in the first decade and 5 between ten and fifteen years. In the 5 cases reported by McCrae, one was aged three and one fifteen. Nevertheless, Churchill,¹⁰ in his paper read before the Society last year, was only able to collect 29 cases under ten years of age reported in medical literature.

On the relative frequency of acute leukemia statistics, beyond indicating its comparative infrequency, are not very definite. McCrae states that in 17,100 admissions into the medical wards of the Johns Hopkins Hospital, there were thirty-seven with leukemia, and of these only five were acute. In Montreal, out of 9,930 medical admissions into the Royal Victoria Hospital, there were 21 cases of leukemia, of which 5 were regarded as acute, and in 10,350 admissions to the medical wards of the Montreal General Hospital, there were 8 cases of leukemia, of which only one was acute.

Acute leukemia in childhood differs in few respects from the

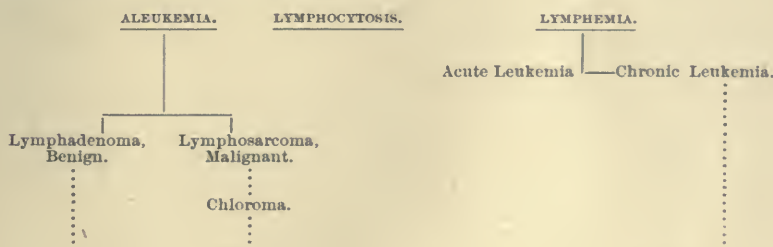
disease as met with in adult life. Hutchison,¹¹ following Guinon and Joly, describes three types of the disease. In the first there is a profound anemia with general glandular enlargement, but hemorrhages appear only in the latter stages of the disease. In the second type the hemorrhagic diathesis is manifested from the outset, petechiæ appear early and the case may assume the aspects of an infective purpura. In the third type, lesions of the buccal cavity are the most striking features.

While the bone marrow is more or less affected in every case, cases are reported in which no splenic or glandular enlargement is present. Kelly¹² has called attention to the fact that while the diagnosis is to be made from the blood examination alone, a single enumeration is not always sufficient. In one of Kelly's cases the leukocytic count showed only 5,200 leukocytes, yet the differential count showed over 90 per cent. of lymphocytes.

Between acute leukemia and chronic leukemia there is no definite dividing line, and although certain authorities have regarded the two affections as different entities, the clinical symptoms and blood examinations present no essential point of difference between the rapidly malignant and the more indolent forms of the disease.

That there may be a close relationship between leukemia and pseudo-leukemia would appear very probable. In an interesting paper published by Dr. Martin¹³ in 1896, attention was called to this fact, and to the tendency to fall back from the present somewhat sharp classification of these diseases and to return to the simple grouping of Trousseau, who included under the single term *adenie* all lymphoid hyperplasias.

In recent lectures Turck,¹⁴ under the term lymphomatosis, included three sub-divisions according to the following scheme, the dotted lines indicating that a connection exists between the affections thus linked together.



In a recent paper he states that he would include under the term lymphomatosis all true hyperplastic tumor formation of lymphoid tissue due to formative disturbances. Thus into one group with this appellation he places all cases of lymphatic leukemia, acute leukemia, pseudo-leukemia, lymphosarcoma, lymphosarcomatosis, chloroma, malignant lymphoma and, perhaps, also, splenic anemia. The fundamental basis of the group he regards as an increased stimulation of growth in the lymphatic system. The etiology is unknown. The difference in the manifestations depends upon two factors:

1. The degree of the increased growth and its local behavior.

2. The presence or absence of a washing out of cells, the result of this growth, into the peripheral blood stream. In one subgroup all the new cells go to the formation of tumor masses and the blood picture is unchanged. The blood finding is alymphemic. In a second and larger subgroup, besides the cells making up the tumor masses, there is an increased washing out into the blood of the cells representing the product of this increased growth, the lymphocytes.

Turck does not deny that the bone marrow may be involved, and even admits the possibility of this being occasionally the sole site of the disease, but he does deny the absolute dependence of the lymphemia upon the blood marrow changes in all cases.

(The discussion of this paper will be found on page 901.)

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A CASE OF ACUTE ALEUKEMIC LEUKEMIA IN A BOY TWO AND ONE-HALF YEARS OLD.*

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The notes of this case are as follows: R. V., male, two and one-half years old, was admitted to the Drexel Children's Hospital March 11, 1905, with a negative family history, both parents and all the other children being alive and well. The patient had been breast-fed for the first seven months of life; he had had whooping-cough when three months old and measles at one year; otherwise he had been in robust health until the beginning of the present illness seven weeks previously. At that time his mother was confined to bed for a few days and he received little attention, living in a cold room most of the time; after this he seemed to have something like the grippe, which was followed six weeks ago with swelling of the feet and lower eyelids. He had neither headache nor vomiting, but he was constipated and passed a diminished amount of urine, and he became steadily paler.

Condition on Admission.—General development, good; marked anemia; lower eyelids so puffy that the eyes are almost closed; considerable hemorrhage under the skin and also under the ocular and palpebral conjunctiva; numerous petechiæ on forehead and on cutaneous surface of lips; numerous submucous hemorrhagic spots, 2 mm. in diameter on dorsal and under surfaces of tongue and on buccal mucous membrane; on the abdomen, near the right anterior superior iliac spine is a black-and-blue spot 2.5 cm. in diameter; smaller spots are sprinkled over the abdomen and legs, but not so profusely as on the forehead. The mind was clear, there was no retraction of the neck, no exaggeration of the knee jerk, no ankle clonus, and Kernig's and Babinski's signs were negative. The breath-sounds were normal everywhere over the lungs. The heart-action was rapid, but the sounds were clear throughout the course of the case. The liver was palpable, 6 cm. below the costal border and the spleen 3 cm. Only one urinalysis is recorded, on the third day after admission, neither albumin nor sugar being present, the sediment consisting of epithelial cells and

* Read before the American Pediatric Society, Lake George, N. Y., June 19, 1905.

leukocytes. The urine was frequently passed in the bed, but it was possible to collect and measure the following daily amounts: 520 cc., 150 cc., 370 cc., 470 cc., 290 cc., 330 cc., so that the kidneys seemed to be acting well, with a minimum of 17 ounces on some days, the rest being lost.

The blood count showed red blood corpuscles, 1,390,000; leukocytes, 6,300; hemoglobin, 23 per cent. There was considerable difficulty in stopping the flow of blood from the puncture of the finger, but pressure finally succeeded after about an hour. The result of the blood count led us to fall back on the diagnosis of purpura hemorrhagica, but as the lymphatic glands, axillary and inguinal, became palpable in a few days, and with the result of the differential count of the leukocytes we were led to regard the case as one of acute leukemia of the lymphatic type, with the leukemic manifestation held in abeyance by some unknown condition. A. O. J. Kelly has reported from the laboratory of the German Hospital such a case, in which syphilis was present, and he thinks it possible that the absence of increase in the leukocytes might have resulted from the associated lues. In this case we are at a loss to know what could have been the deterring factor. The differential counts were made both by the resident physicians and myself with striking similar results, a count of 700 leukocytes giving:

Polymorphonuclears	.....	8.85	per cent.
Large mononuclears	.....	4.73	“ “
Lymphocytes	.....	85.00	“ “
Myelocytes	.....	1.42	“ “

The stained red corpuscles showed microcytes, macrocytes, poikilocytes and normoblasts.

Four days after admission nose bleed occurred and was followed in a few hours by vomiting of clotted blood. Subsequently the bowel-movements were dark brown in color, but the vomiting after that did not show blood, so it is possible that the intestinal tract was not the seat of hemorrhages.

The temperature ranged between 99.5° and 101° for three days after admission and then remained close to the 101° line for three days more, rising on the seventh day to 105.4°, falling the next morning to 101°, when death occurred from exhaustion. It is to be regretted that an autopsy was not permitted.

As the case stands it is, of course, incomplete and the naming of it is largely a matter of speculation. It was evidently an in-

fection whose manifestations were localized mainly in the blood and lymphatics, and as acute lymphatic leukemia is so considered, and as this form does not necessarily have as high a leukocyte count as the other forms, it seems more reasonable to class the case here than elsewhere. I prefer to consider it as such rather than purpura hemorrhagica, because the bleeding was not the most prominent symptom and because of the differential count. Malignant endocarditis is not absolutely excluded in the absence of an autopsy, but the heart-sounds never showed even the softest murmur, there were no signs of embolism and the kidneys were unaffected.

By a curious coincidence the issue of the Journal of the American Medical Association for March 18, 1905, the day the patient died, refers to a case reported by Dr. Geo. Blumer, of acute Hodgkin's disease, the description of which is strikingly like the above, the author remarking that perhaps it would be better to consider it as acute aleukemic leukemia.

DISCUSSION OF THE PAPERS OF DRS. BLACKADER AND GILLIES AND OF DR. HAND.

DR. HOLT.—There is nothing upon which we need greater light than these acute blood conditions; the difficulty of knowing where many of these cases are to be placed is very great. I saw a case two months ago that in my experience was unique and it is suggested by these two reports. A little girl, eight years of age, seemed quite well and attended school on Wednesday; later in the afternoon she amused herself by jumping rope. On Thursday morning she was taken with vomiting and a temperature that quickly reached 104°F. On Friday, the vomiting and fever continued and there took place a free hemorrhage in the bladder; the family physician thought she passed about a pint of blood; the quantity was surely large, but it was mixed with urine. By Saturday there was present a condition of intense toxemia with steadily high temperature and great prostration. On Sunday, the first blood count was made, and the red cells had fallen to 1,500,000, the leukocytes were 133,000, and the hemoglobin was only 20 per cent. I saw the child on Monday and her general appearance strongly suggested that of typhoid in the third week. There was no jaundice though she had that pale, yellowish green color. The nervous symptoms were very pronounced, the tongue was dry and there were sordes on the lips. The prostration was intense and there was a soft systolic murmur which we thought was hemic. Greatly to our surprise the child began to improve

on Tuesday, and by Thursday the nervous symptoms disappeared, the red cells increased to 3,000,000, and in ten days the hemoglobin had arisen to 60 per cent.

The picture is one I have never seen before, and the most striking feature was the outcome, for it looked as if the child was in a hopeless condition. What the nature of the case was I am unable to say. The blood showed no evidences of malaria or typhoid. The changes were those of an intense secondary anemia with marked leukocytosis.

DR. KOPLIK.—There is one point brought forward by the readers of both papers, and that is the importance of not coming to a conclusion on the strength of one leukocyte count. That point was brought out by Dr. Osler in his excellent paper on leukemia. He showed that in adults the blood might return to a normal standard in this disease and remain there for some time. This was beautifully illustrated in a case of acute leukemia in a child thirteen months of age that was under my care. When I first saw the child, all the symptoms of acute leukemia were present as we are accustomed to see it in the adult, and I took the child into the Mt. Sinai Hospital and studied it for some time. With a red count of 1,500,000, the leukocytes were 96 per cent. of the white cells. I made repeated counts and, strange to say, for a week in the course of this leukemia the blood count returned to a perfectly normal standard with the normal relative relation of the lymphocytes to the polynuclear leukocytes. When the resident physicians were thinking that some mistake had been made in the diagnosis and I was preaching Osler to them the change occurred, the child gradually increased its lymphocytes, running up to 90,000 and before death, which took place a week or so afterwards, developed a marked lymphocytosis. The case shows the necessity for frequent counts and the fact that one leukocyte count means very little.

Regarding the duration of some of acute leukemia, I saw a case the other day in which I had made the diagnosis six months ago and predicted a fatal issue at that time. I received a message a few weeks later that the child had improved. I saw it again recently, after an attack of diphtheria; the picture of leukemia had become marked again and the child died because of a recrudescence of the blood disease after the attack of infectious disease.

DR. EDSALL.—I reported a case at the last meeting of the Association of American Physicians that presented some features that were of particular importance in connection with children. The patient was an adult who had a rapidly progressing acute leukemia. When I first saw him the most striking point was the close resemblance to diphtheria. He had become gravely ill within a few days and had fever, nasal obstruction, with a watery blood-stained discharge from the nose, patches of pseudomem-

brane in the nose, difficulty in swallowing and a high grade of laryngeal stenosis. When first seen there was no pseudomembrane on the tonsils, but twenty-four hours later both tonsils were covered with necrotic pseudomembrane, and at that time I think it would have been impossible without culture to have excluded diphtheria. This point in the diagnosis of acute leukemia is, so far as I know, not clearly emphasized in the literature. It is, however, of importance because necrosis of the tonsils and pseudomembrane formation is quite common in acute leukemia.

Another point is perhaps worth mentioning. In most cases of acute leukemia there is a tremendous increase of metabolism, and particularly a remarkable increase in the destruction of nuclein-containing tissues. It has been suggested by several men, first of all, I think, by Dr. Alonzo Taylor, that it might be possible in the earlier stages of acute leukemia or in cases in which the diagnosis remains persistently obscure, to get help from a determination of the uric acid of the urine. The uric acid output has been found in many instances to be enormously increased, and has reached even to the point of 8 grams a day. Dr. Taylor and I did some work along this line in connection with children a few years ago, but without any satisfactory results; and it now seems to be that the method is not promising in relation to diagnosis because, apparently, the great increase in uric acid excretion occurs only late in the disease. Still it might perhaps be of value in those cases that run throughout a course that is more or less obscure. It would, however, be perhaps quite as useful to make an estimation of the urea as of the uric acid, because the urea is also enormously increased. Clinical urea estimations are, of course, very inexact, but in this instance only gross changes would be of much importance, and probably even an inexact method would give fairly useful results if any help in diagnosis were to be gained by this means.

DR. MORSE.—It seems to me that the diagnosis of acute leukemia is hardly justified in Dr. Hand's case, and that the condition he describes can be explained in another way.

DR. ABT.—A case came under my observation recently that emphasizes at least one difficulty in making the diagnosis of these cases of lymphatic leukemia. A boy, thirteen years of age, who had been ill during his infancy and early childhood, suffering from rickets, laryngismus stridulus and malnutrition. When he was about six years old he met with a severe injury by being run over, both knee-joints were opened and the surrounding tissues crushed. His present illness began in March of this year. He complained of pain in his extremities, he was tired, became breathless on effort, his appetite was poor, and he lost some in weight. In the meantime the anemia became progressively more marked, and the spleen was continually decreasing in size. When I first

saw him he was very anemic, much reduced in weight, the hemoglobin per cent. (Fleischl) was about 50 per cent. There were about 2,000,000 red corpuscles and 21,000 leukocytes. The differential count showed a preponderance of the lymphocytes, which were present to the extent of 70 per cent. But at this time he had a very severe tonsillitis and pharyngitis. The spleen was large, extending as far down as the level of the umbilicus. At this time it was thought that possibly he was suffering from a lymphatic leukemia, but in a few days with the diminution of the throat symptoms, the number of leukocytes fell so that now there were but 4,000 present, and this condition of leukopenia has continued. In other words, I believe that the little patient was sick with a splenic anemia, that the picture of this disease was changed by an intercurrent pharyngitis and tonsillitis which caused the disease to resemble for a few days an acute lymphatic leukemia.

DR. BLACKADER.—I think we have all noted the fact which has been illustrated in such an interesting way by Dr. Koplik's case, namely, the great recuperative power manifested occasionally by the elements of the blood; we would suppose, *a priori*, that the child would have this power of recuperation to a greater degree than the adult.

DR. HAND.—I have only to emphasize the remarks made by Dr. Holt, which reminds me of Dr. Osler's remark concerning the erythema group, that we need a Linnæus to bring us out of the dark.

Ovarian Tumor in Child: Torsion of Uterus.—Nagel (*Zentralbl. f. Gynäk.*, No. 4, 1905) performed ovariectomy on a child aged eight. There had been abdominal pain, with swelling for a year, but for three days the child had suffered from vomiting, constipation, and tympanites, with great increase of the pain. Acute axial rotation was diagnosed. At the operation only one trifling omental adhesion was discovered, and the cyst came out easily after tapping. It showed no degenerative changes, but its pedicle was twisted half a turn. On close inspection that pedicle proved to be the left broad ligament and the uterus involved in the torsion; owing to the tumefaction the limits between the uterus and the pedicle were at first hard to distinguish. The uterus and the right appendages, which showed no sign of disease, were saved. There was hardly any rise of pulse or temperature during recovery; the bowels were opened freely on the second day by Karlsbad salts.—*British Medical Journal*.

FAT INDIGESTION FROM A MOTHER'S MILK.*

BY W. P. NORTHRUP, M.D.,

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Presbyterian and Foundling Hospital of New York.

This is a tale of poisoning. It recounts a familiar story, how a mother's milk acted in a noxious manner upon her infant, with deleterious effect upon its health. You will recognize the words of the dictionary. It is a temptation to call it fat poisoning, but I fear someone will begin asking hard questions. I want further to leave a glow between the lines, "halation" I think the photographers name it, of even more important information. Among the many things to learn is what high specialization may lead to when once turned loose.

The infant under consideration was eight and a half weeks old when it came under my personal observation. Its symptoms then were those of disturbed bowels. The infant apparently was not very sick, was naturally small, its skin a little slack, as though the contained infant had shrunk a little, its demeanor indicative of a certain amount of general discomfort rather than colic or local pain. The important feature of its present condition was frequent and abnormal passages. It was the second child of young, healthy parents, born in uneventful labor, the elder child at present living and thriving. The mother loved to nurse her infant, and apparently had an abundance of milk. The infant took it, was five ounces heavier by careful weight after nursing than before; the child's passages were green and curdy, frequent and fluid. The provident parents had selected the best accoucheur in the city, who attended the mother for ten days, then passed the mother and infant to the care of an excellent family physician, both mother and child in good condition. Since the infant was on the breast, it was to be supposed that nature must be furnishing a milk in the mother's breast suited to the needs of the infant of her womb. Earthly prudence exercised its utmost in ensuring life's beginnings in the second born. With their first born the parents felt they had made mistakes, with the second they would make none. With the first born the physicians told the mother her milk gave out because she did not eat enough, and did not do other

* Read by title at the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 20, 1905.

things which they claimed they had advised. In any case, the little woman felt that this time she would leave nothing undone, this time she should not be blamable. She ate everything that came to her on the tray. Though her gorge rose at the sight and her stomach made strenuous involuntary contractions at the very savor of the approaching food, she engulfed it all. It may be remarked here that she was always indoors and took no exercise.

Between the third and fifth week the mother had tonsilitis, the temperature, reaching 104° F. Over the telephone my advice was asked, and I said, after learning that the attack was short and sharp with fever, that the infant might continue nursing so long as there was no appreciable disturbance. The fever speedily disappeared, the milk continued abundant and the infant thrived.

It was not long afterwards that the mother had a second attack of tonsilitis, in which it was believed the milk was disturbed. Of this attack I knew nothing until it was concluded that the baby's bowels were seriously deranged, the baby was losing sleep from colic, was losing weight. When I came to see the child and mother, I concluded that the mother looked too pale, too weak, too exhausted to continue nursing. In the eighth week the baby began to have frequent colic, several passages daily, brownish, frothy, containing milk curds, mucus in lumps; color olive green to brown, much gas.

The infant was receiving five ounces of breast milk from a devoted mother, in cool weather, its intervals of feeding and general care regulated by a trained nurse. One would think this was enough to ensure the thriving of the infant.

Acting on the thought that the disturbance was but slight and transient, that simple remedies would quickly correct the disorder, I cleansed the intestinal ways by a free dose of castor oil, directed that the mother should go out to drive in the open air, should sleep all night, feeding the baby twice during the twenty-four hours with weak modification of milk from the laboratory. She was to save her strength. She looked very pale and worried.

It seemed best to clean the baby's bowels again with oil, this time removing it from the breast entirely. It was fed on barley water for twenty-seven hours. During this time the baby was comfortable, though it acted hungry. The breast milk was tried again, colic, restlessness and gas returning at once. After that dilute feedings of Walker-Gordon milk with barley water, equal quantity, were tried, and the baby at first thrived. (2 per cent.

fat, 5 per cent. sugar, 0.75 per cent. proteids, one and one-half ounces, plus barley water one-half ounce.) The baby lost two ounces of weight. Digestion was for a time proceeding fairly well and the milk was increased to milk two parts, barley water one part, finally to full prescription. Directly mucus, colic, frothy passages again made it apparent that milk was out of the list of food for a time.

The mother looked very pale, bluish in the deep valleys under the eyes, was very nervous and worried about the baby. The extraordinary thing was that the breasts were full and the milk rich with cream. During this time the mother's milk was pumped and fully examined by Dr. E. E. Smith. Its fats were found to be 8.98 per cent., sugars 6.29 per cent., proteids 1.28 per cent. There was nothing extraordinary reported beyond an excess of fat. The particular symptom arising from such excess was diarrhea without vomiting. The passages were brownish, or between brownish and olive green, frothy, foul smelling, expelled with much gas, bubbles and seethings, with coarse fluttering sounds interspersed with loud detonations. The conspicuous feature was the wonderful gas-making capacity of the interior and contents of the intestines. There was also much mucus, tenacious masses, "wads." While this condition prevailed the baby cried all night with colic and slept none.

It was apparent that the baby could not yet take any milk. I gave castor oil once more to remove fermenting food and mucus. After castor oil the baby was kept exclusively on barley water for three days. When milk was resumed again colic reappeared promptly. The baby was always better on barley water. At the second attempt to complete the restoration of the intestine, cereal feeding was continued nine days. Barley water was given alternating with imperial granum and occasionally white of egg. Gradually, after nearly all mucus had disappeared, a single teaspoonful of "guaranteed" milk was added to a three ounce feeding of barley water, and gradually increased every second feeding, until four teaspoonfuls were taken in each. On the third day mucus reappeared, and the castor oil and barley water cycle was again traversed. This advantage had been gained, the infant could digest a little milk. From this beginning it went on to recovery. Irrigations were frequently resorted to, and were of great service. However, it was believed that the mucus was formed partly in the ileum, and castor oil was needed to reach it.

Quite as much a part of treatment as anything else was the airing to which the patient was treated. The family had learned the good effects of fresh air treatment, and the little infant lay many hours in a bed at first in a distant part of the room, later in the air and sun close by the window, and it was the month of January.

One peculiarity which this infant manifested was a tendency to marked puffiness of hands and face on taking calomel in $\frac{1}{10}$ grain doses. The baby's urine was negative. Twice she manifested these symptoms in such degree that it was deemed wise to record a calomel idiosyncrasy against her for a few years at least.

I had great pleasure and help in having Dr. Jacobi see this infant with me. I thought no man could be better fitted to help feed a baby unable to take a trace of milk than he. He did it.

It is now six months from the acute stage, the infant is perfectly well and has been satisfactorily vaccinated. Has gained ten ounces during each of several weeks.

POINTS TO BE NOTED.

(1) This willing mother fell into misfortune through the conflicting purposes of too many excellent physicians. All these accidents would have been prevented if any one excellent person had had sole responsibility.

(2) Excess of fat produced in this case ileocolitis with these symptoms:—diarrhea (no vomiting), with frothy, brownish to olive green offensive passages, containing excessive amount of mucus in tenacious masses, colic, sleeplessness, loss of weight.

(3) Excess of fat was apparently produced by forced feeding, including a quart of milk daily, lack of exercise, indoor living, two attacks of tonsilitis.

(4) Fat was lowered by diet and driving in the open air, from 8.98 per cent. to 4.90 per cent.

(5) This infant had become extremely susceptible to the presence in her food of the least trace of milk and could not digest it.

(6) The first attack of tonsilitis apparently disturbed the baby's digestion somewhat. The second, with its consequent anemia, wholly upset it.

(7) Another time I should take the baby from the breast at once.

TEMPERATURE, PULSE AND RESPIRATION RELATIONSHIPS IN INFANCY AND CHILDHOOD.*

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At the suggestion of Professor J. P. Crozer Griffith, I have undertaken a study of the relation the pulse and the respiration bear to the temperature and to each other in febrile conditions in children, omitting from consideration those diseases in which the pulse or respiration is known to be unusually slow or rapid.

It is a matter of common observation that the respiration and the pulse are very irregular in children, and are more markedly so the younger the child. Some writers even maintain that it is practically impossible to determine any normal relationship for a given age. Yet physicians recognize that in certain diseases the pulse or the respiration or both may be unusually slow or unusually rapid, a recognition which implies that at the different ages there does exist some range of figures within which pulse and respiration should fall for each degree of temperature. Moreover, every pediatricist is able from experience to estimate that a certain pulse rate is too high, although none can easily tell just what is meant by this. In medical literature little, if any, information can be found on the subject.

I have therefore attempted to discover what figures at the various ages in infancy and childhood represent the ordinary ratios that the increase in the pulse-rate and the increase in the respiration-rate should bear to the degree of increase in the temperature, and that the pulse-rate and the respiration-rate should bear to each other.

In adults the ratios are fairly definite, an increase of ten pulse beats and two respirations and a half for each degree of increase in the temperature and a pulse-respiration ratio of 4:1, as given by Handford,¹⁰ Griffith,⁸ Aitken,¹ and others, being accepted generally. These figures, of course, are not found in cases of pyrexia when the heart, lungs, or meninges are involved, in typhoid fever and scarlet fever, and in some other affections (Donne,⁵ Handford,¹⁰ etc.); even in diseases where these ratios are the rule, the

* Read by Dr. J. P. Crozer Griffith at the Seventeenth Annual Meeting of the American Pediatric Society, Lake George, N. Y., June 18, 1905.

greatest variations from them may undoubtedly occur (Smoler,¹⁷ Billet,³ Liebermeister,¹² Monti,¹⁴ etc.).

Before taking up the study of the ratios that exist when the temperature is elevated I have sought to determine what are the ordinary pulse- and respiration-rates at the different ages in infancy and childhood when the temperature is normal.

THE NORMAL AFEBRILE PULSE- AND RESPIRATION-RATES AT
DIFFERENT AGES IN CHILDREN.

A number of pediatricists have given what they regard as the normal pulse- and respiration-rates to be expected in healthy children of different ages; their figures follow:

ASHBY AND WRIGHT. ²	Newborn.	Early months.	End of 1st yr.	3-4 yrs.	5 yrs.	8 yrs.	12 yrs.	15 yrs.
Respiration...	44	35-40	28	25	22	20	20	20
Pulse.....	139-133	120-140	110	..	100	90	80	..

COMBY. ⁴	Birth.	1st months.	3-8 months.	1-2 years.	6 years.	12 years.
Respiration...	35	..	..	27-25	22	20
Pulse.....	138-140	130-135	120-125	115-120	..	..

GRIFFITH. ⁹	Birth.	1st mo.	1-6 mos.	6 mos.	1 yr.	1-2 yrs.	2-4 yrs.	6-10 yrs.	10-14 yrs.
Pulse.....	130-150	120-140	130	120	120	110-120	90-110	90-100	80-90
Respiration	30-50, av. 40	25 35, average				30	28	25	20-25

MONEY. ¹³	1st weeks.	1st year.	1-4 years.	5 years.
Pulse	150-120	100-120	100	90
Respiration	30-50	25-35	..	..

MONTE. ¹⁴	1st day-2 mos.	2 months-1 year.	2 years.	3-5 years.	6-10 years.	10-15 years.
Pulse.....	140-120	130-100	120-90	110-72	104-64	80-60

PARRY AND HODGE. ¹⁵	Under 6 months.	6-12 months.	12-18 months.	18-30 months.
Pulse.....	125	124	115.5	111.8
Respiration.....	44.8	34.8	35.5	29.8
Cases.....	27	2	4	7
Number of observations	90	11	24	37

ROTCH. ¹⁶	Early weeks.	Until 2d year.	2-3 years.	3-5 years.	5-8 years.
Pulse.....	120-140	110	100	..	90
Respiration..	45	15 40	..	25	..

SQUIRE. ¹⁸	1st few months.	2d to 7th year.
Pulse.....	120	100
Respiration.....	40	24

STARR. ¹⁷	Birth-2 mos.	2-6 mos.	6-12 mos.	1-3 yrs.	3-5 yrs.	5-10 yrs.	10-12 yrs.
Pulse.....	160-130	130-120	120-110	110-100	100-90	90-80	80-70
Respiration..	44	35	23				..

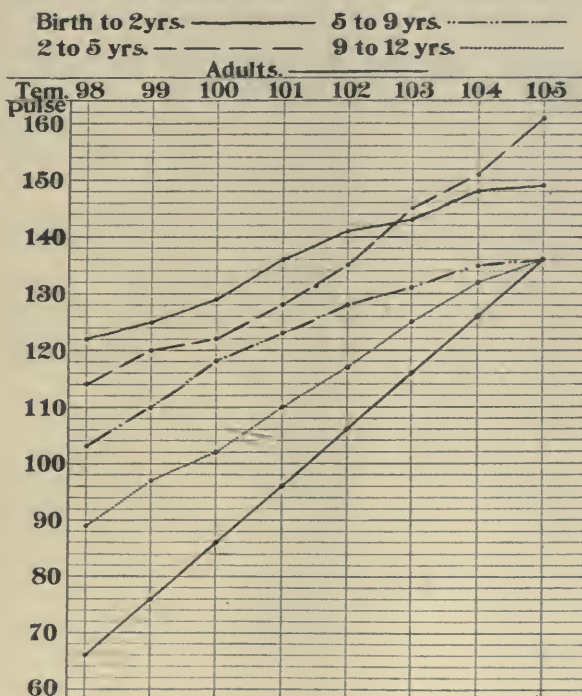
TAYLOR AND WELLS. ²¹	Newborn.	2d year.	7-14 years.
Pulse.....	120-140	100-115	80-90

THOMPSON. ²²	Birth.	6-12 mos.	1st year.	2-4 years.	2-6 years.	7 or 8 years.	11-14 years.
Pulse.....	120-140	115-105	..	..	105-90	..	85-75
Respiration	32-50	..	25-35	25	Higher than adults.	..	..

The figures given by most of these writers appear arbitrary and schematic instead of based upon scientific investigations; Parry and Hodge are the only ones to record the number of cases and observations used in determining the averages.

In recording the results of my observations I have divided infancy and childhood into four periods: (1st) birth to the

**PULSE CURVES AT DIFFERENT AGES WITH
THE DIFFERENT DEGREES OF TEMPERATURE.**



end of the second year, *i. e.*, infancy; (2d) two years to the end of the fifth year, *i. e.*, early childhood; (3) five years to the end of the ninth year; and (4th) nine years to the end of the twelfth year. The average pulse-rate and respiration-rate I obtained for the normal temperature (98°) in each period and the number of cases and observations from which those average rates were calculated are given in the table below.

It should be borne in mind that the observations were made on

children who were sick or convalescent, and that no particular effort was made to examine the children when asleep or exceptionally quiet. Nevertheless, inasmuch as I excluded all cases in which the disease could be expected to materially influence the pulse and respiration, my figures may be regarded as fairly average ones.

RESPIRATION CURVES AT DIFFERENT AGES WITH DIFFERENT DEGREES OF TEMPERATURE.

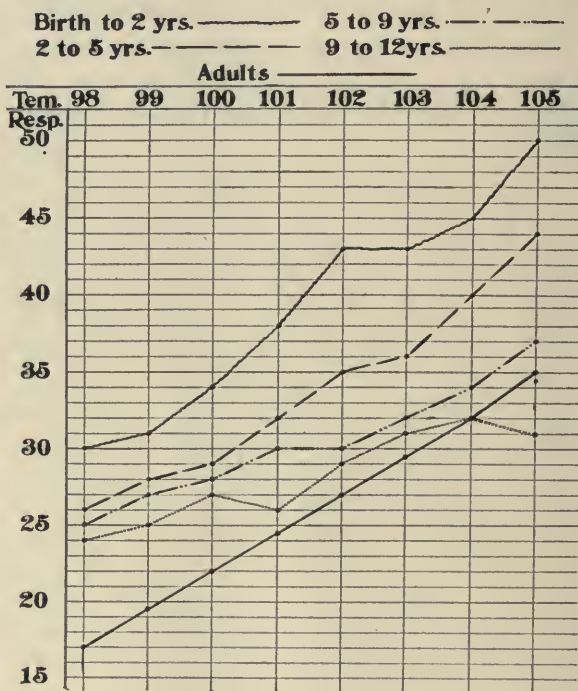


TABLE I.

THE AVERAGE PULSE AND RESPIRATION-RATES IN CHILDREN
WITH NORMAL TEMPERATURE.

	Birth to 2 years.	2 to 5 years.	5 to 9 years.	9 to 12 years.
Pulse-rate	122	114	103	89
Respiration-rate	30	26	25	24
Number of cases.....	44	40	29	16
Number of observations..	370	335	257	151

The statistics of the normal pulse-rate and respiration-rate given by the different observers cannot be easily combined owing to the different groupings of the ages. My figures, being based on a fairly large number of cases and observations, may be therefore taken as probably representing the average.

These figures show that although the pulse-rate and the respiration-rate are more rapid the younger the child, they do not decrease uniformly with advancing years. The respiration-rate, on the one hand, decreases four in passing from the first to the second period, and then one in passing to each of the remaining periods. The pulse-rate, on the other hand, decreases more uniformly, being eight less in the period from two to five years than in the one immediately preceding, eleven less in the period from five to nine than in the one before, and fourteen less in the fourth period than in the third, the amount of decrease for each period being always greater by three than that for the period immediately preceding. This difference between the pulse-rate and the respiration-rate as regards the amount of decrease produces a variation in the normal pulse-respiration ratio, which is approximately 4:1 for the first period, $4\frac{1}{2}$:1 for the second, 4:1 for the third, and $3\frac{1}{4}$:1 for the fourth. These ratios, as has been stated, are for afebrile states.

THE PULSE- AND RESPIRATION-RATES IN FEBRILE CONDITIONS IN INFANCY AND CHILDHOOD.

In endeavoring to ascertain the average pulse-rate and respiration-rate in febrile conditions I examined more than 7,000 case-histories, but discarded all those in which there was any evidence of cardiac, pulmonary or meningeal involvement or of malnutrition, as well as all cases of typhoid fever, scarlet fever and rickets. This was done because the pulse or the respirations or both are well known to be abnormally slow or rapid in these conditions. There was then left a total of 162 cases, a number by no means large enough to admit of positive assertions, but still of sufficient size to furnish some guide.

As already stated, the years of childhood were divided into four periods, namely: Birth to the end of the second year, two years to the end of the fifth year, five years to the end of the ninth year, and nine years to the end of the twelfth year. I endeavored, when possible, to obtain in each case at least ten records of the pulse and of the respirations for each degree of temperature, with

which I included the fifth above and the fifth below. From these I calculated the average rates for that case. I also tried, when possible, to secure in each period at least 10 cases for every degree of temperature. The average pulse and respiration for each period was obtained by combining the average rates of all the cases in that period. Below is a table giving the number of cases and observations I was able to obtain for each degree of temperature in each period.

TABLE II.

NUMBER OF CASES AND OBSERVATIONS.								
	Birth to 2 years.		2 to 5 years.		5 to 9 years.		9 to 12 years.	
	Cases.	Observations.	Cases.	Observations.	Cases.	Observations.	Cases.	Observations.
98°	44	370	40	335	29	257	16	151
99°	44	487	26	275	33	353	17	170
100°	40	390	34	334	35	257	17	189
101°	36	181	36	169	33	258	18	88
102°	33	122	29	149	36	251	15	63
103°	22	64	27	110	25	117	8	57
104°	22	51	19	103	23	55	7	22
105°	5	11	9	21	6	12	2	5

THE AMOUNT OF INCREASE IN THE PULSE-RATE PER DEGREE OF TEMPERATURE AT DIFFERENT AGES.

The relationship between the temperature and the pulse in febrile cases has been very little studied. Jordan¹¹ even asserts that no such relationship exists; but he draws this conclusion after studying cases of scarlatina, enteric fever, empyema and tuberculous meningitis, conditions in which the ordinary relation of the temperature, pulse and respirations is commonly disturbed.

In children under four years of age Gerhardt and Seifert⁷ find the pulse-temperature (Centigrade) ratio of increase to be 10:1 (Fahrenheit 5.5:1) with mild febrile reaction, and still greater with higher fever; in children over four years of age they believe the ratio to be 10:1 (Fahrenheit 5.5:1) with high, but less with lower temperatures.

Monti,¹⁴ in a table apparently schematic and not based upon actual observations, gives the pulse-temperature (Centigrade) ratio of increase as 12:1 (Fahrenheit 6.6:1) for children under two years of age, and as 10:1 (Fahrenheit 5.5:1) for children over that age.

Handford ¹⁰ gives no figures, but states that in children over ten years of age the pulse is more rapid than in adults.

Smith ¹⁹ also makes the mere statement that febrile and inflammatory diseases produce a greater acceleration of the pulse in early life than in maturity.

The following table gives the average pulse I obtained for each degree of temperature at different ages, with the pulse-rate in the adult added for the purpose of comparison.

TABLE III.

AVERAGE PULSE-RATES IN FEBRILE CONDITIONS IN CHILDREN.

	Birth to 2 years.	2 to 5 years.	5 to 9 years.	9 to 12 years.	Adults.
98°	122	114	103	89	66
99°	125	120	110	97	76
100°	129	122	119	102	86
101°	136	128	123	110	96
102°	141	135	128	117	106
103°	143	145	131	125	116
104°	148	151	135	133	126
105°	149	161	136	136	136

Despite the great variations which undoubtedly exist, it is nevertheless possible from the observations recorded to make an approximate estimate of the average increase in the pulse with each degree of increase in the temperature. This may be stated as four in the period from birth to two years, five in the period from five to seven years, and seven in the periods from two to five years and from seven to twelve years, as compared with an increase of ten in adult life. Why the second period should exhibit a greater degree of increase than the third I am unable to explain. Such a condition may be shown by further studies to be not constantly present, although, on the other hand, it may constitute an actual exception to the rule one would expect, namely, a progressive increase in the ratio.

The general trend of my observations nevertheless appears undoubtedly to bring out the surprising and interesting fact that, although for the same degree of temperature the *actual number* of pulse-beats tends to be greater the younger the individual, the *amount of increase* in the pulse tends to be greater the older the individual. It would thus appear as though fever obliterates the difference between the pulses

of different ages; as though there is almost a common pulse rate for high temperatures which all cases, irrespective of age tend to reach. Infants, starting with the highest afebrile pulse, naturally, as the temperature rises, have a lesser number of pulse-beats to cover in order to reach this figure; consequently they exhibit the least ratio of increase, only 4:1. Adults, starting out with the lowest afebrile pulse-rate, have the greatest number of pulse-beats to cover; hence their pulse-temperature ratio of increase is the greatest, being 10:1. These conclusions, it will be noted, are in direct contradiction to the view quite commonly accepted, which is expressed, for instance, in the quotation from Monti.

There are, of course, numerous cases where the pulse-rate in early life is higher than my averages show. Various accidental causes, however, may account for this; such cases can hardly be considered as fairly representative ones. The circumstance, moreover, that appears in my table and in the graphic chart, of the pulse being greater in the second period than in the first when the temperature is over 103°, may be accidental or may represent an actual exception to the tendency stated above.

THE AMOUNT OF INCREASE IN THE RESPIRATION-RATE PER
DEGREE OF TEMPERATURE AT DIFFERENT AGES.

The only writer to refer to the ratio of increase in the respirations is Handford,¹⁰ who says that in children over ten the respirations do not seem to be so much accelerated as the pulse.

The average respiration-rates I obtained for each degree of temperature at the different ages are given in the following table, in which, as before, I have inserted for comparison the respiration-rate in the adult.

TABLE IV.
AVERAGE RESPIRATION-RATES IN FEBRILE CONDITIONS IN
INFANCY AND CHILDHOOD.

	Birth to 2 years.	2 to 5 years.	5 to 9 years.	9 to 12 years.	Adult.
98°	30	26	25	24	17
99°	31	28	27	25	19.5
100°	34	29	28	27	22
101°	38	32	30	26	24.5
102°	43	35	30	29	27
103°	43	36	32	31	29.5
104°	45	40	34	32	32
105°	50	44	37	31	34.5

As in the case of the pulse, it is possible to estimate the average amount of increase in the respiration-rate with each degree of increase in the temperature. This may be stated as 3 in the period from birth to two years, $2\frac{1}{2}$ in the period from two to five years, 2 in the period from five to nine years, and $1\frac{1}{2}$ in the period from nine to twelve years, a difference of half a respiration in each period. The respiration-rate resembles the pulse-rate also, in that for the same degree of temperature the actual number of respirations tends to be greater the younger the child.

Yet for the same degree of temperature the amount of increase in the respirations tends also on the whole to be greater the younger the child, a condition just the opposite to that of the pulse. Thus, while the temperature is rising from 98° to 105° the respiration-rate is increased by 20 in babies under two years, but only by 7 in children over nine years of age.

Consequently, as regards the respirations, fever does not seem to obliterate the difference between ages, there being not the slightest tendency for the respiration-rates of the different ages to approximate as the temperature rises; in fact, rather the reverse seems true.

THE RATIO OF THE PULSE-RATE TO THE RESPIRATION-RATE IN FEBRILE CONDITIONS IN INFANCY AND CHILDHOOD.

The pulse-respiration ratio (*i.e.*, the ratio of the actual pulse-rate to the respiration-rate, not the ratio of their amounts of increase) has not been studied by many writers. Thompson²³ fixes it at $3\frac{1}{2}:1$ or $4:1$ in health and believes that any great disturbance of these ratios is of clinical significance. Squire¹⁸ states that notwithstanding the readiness with which the breathing and the pulse vary in infancy under the slightest exciting causes, they maintain a relation to each other which is characteristic of the early period of infancy and which differs from the ordinary ratio of childhood and adult life. He finds the actual ratio of the pulse to the breathing only $3:1$ in early infancy, and even less, and when this is steadying down to the more mature ratio of $4:1$ he believes that any causes that quicken the rate also increase the ratio.

The pulse-respiration ratio according to my figures is practically $4:1$, except in infants under two years of age with a temperature above 100° , and in children from two to nine years with a temperature above 104° . In these cases it is practically $3.5:1$, except in infants with a temperature of 105° , in whom it is $3:1$. The exact figures are given in the following table.

TABLE V.

PULSE-RESPIRATION RATIOS IN INFANCY AND CHILDHOOD.

	Birth to 2 years.	2 to 5 years.	5 to 9 years.	9 to 12 years.	Adult.
98°	4.1:1	4.4:1	4:1	3.7:1	4:1
99°	4:1	4.3:1	4:1	3.9:1	4:1
100°	3.8:1	4.2:1	4.2:1	3.8:1	4:1
101°	3.6:1	4:1	4.1:1	4.2:1	4:1
102°	3.4:1	3.9:1	4.3:1	4:1	4:1
103°	3.3:1	4:1	4.1:1	4:1	4:1
104°	3.3:1	3.8:1	4:1	4.2:1	4:1
105°	3:1	3.6:1	3.7:1	4.4:1	4:1

From this table it would appear that in children under five years of age the pulse-respiration ratio is less, the higher the temperature; but that in children over five years the ratio is influenced by the temperature very little or not at all. A general conclusion may be drawn that the pulse-respiration ratio is 4:1 in children of all ages and at all temperatures, except in infants with any amount of fever and in children from two to nine years of age with hyperpyrexia, in whom the ratio becomes 3:1 or 3.5:1.

In closing I desire to express my thanks and appreciation to Professor J. P. Crozer Griffith for placing his clinical material at my disposal and for rendering me invaluable assistance and encouragement in the preparation of this paper.

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DISCUSSION.

DR. HOLT.—I suppose we are all somewhat surprised by these results. As regards the pulse, it is a question whether a larger number of investigations would bear out these conclusions. I am speaking particularly, of course, of the first two years of life. Personally, I should like to see a larger number of cases studied before we consider this question settled.

Another source of error should be considered. Observations

of this kind cannot be made properly unless made with reference to the particular question studied. If ordinary history records are used for analysis, and the pulse and temperatures are taken under different circumstances, sometimes asleep and sometimes awake, one will get varying and unreliable results. The nurses made many of these examinations, too, and you are all familiar with the unreliability of nurses' records as regards pulse rate.

DR. JACOBI.—My remarks would be similar to those made by Dr. Holt. I would not, from my experience, trust a nurse for examinations of this sort. I would not, from my experience, trust most senior or junior medical assistants, but I would trust most, but most only, house physicians to make such observations. Furthermore, every one of those observations should be made during sleep; anything else is unreliable.

DR. HAND.—Whatever exceptions we may take to the way this data was collected I think we may consider the conclusions as safe, as regards the first two groups of figures particularly. Whenever I find a pulse rate of 180 in a sick child I begin to feel anxious about the outcome of that case. I have seen a few cases of 180 persistent pulse recover, but they are very rare.

The only exception I would make to the chart is that perhaps the figures for the normal pulse rate of the young child are rather high.

DR. GRIFFITH.—I am glad to see this skepticism, because I had it myself at first. We are prone to be influenced by our preconceived notions of what things *should* be. When I first saw these figures, I said: "There must be something wrong. Look them over again." Dr. Cohen did this, as I requested, but found them correct. When you come to think of it, you will perceive the reasonableness of what Dr. Hand has just said. The infant's pulse *cannot* increase 10 beats per degree of temperature, as the adult's does; otherwise, it would, with every hyperpyrexia, be dangerously rapid.

Now, regarding the criticisms which have been made, I have this to answer. First, inspection of the figures contained in Dr. Cohen's paper will show that they are for most temperatures and ages quite large enough to allow of conclusions being drawn with propriety. Second, it is objected that the estimations of the pulse were made by nurses and, therefore, cannot be depended upon. This seems to me a rather scathing arraignment of the ability of a nurse to do what she is trained to do. She may be unable to judge properly of pulse tension and strength, and their significance, but surely she should be able to count the number of beats per minute. In any case, Dr. Cohen's paper presents to you only the methods which each one of you is following every day. You enter the sick room or the hospital ward and examine the tem-

perature record taken by the *nurse*, and the rates of pulse and respiration taken by the *nurse*. We publish records of cases based upon these. I only ask you to compare these records with the records presented you this evening. The objection which one speaker has raised, that he has often found the child's pulse 30 or 40 beats higher than that which the nurse has recorded, is very readily explicable. The nurse's record was probably correct. The child is more used to her presence, and the approach of the physician would naturally send up the pulse rate. Third, it was objected that the pulse rate ought to be taken during sleep. This is probably true. As is well known, the rate is probably 20 or 30 beats per minute less than when awake. I am glad the speaker mentioned it, because the record during sleep would make the pulse rates on Dr. Cohen's chart even lower than they are at present, and make them illustrate even more the point which I am making, viz., that with high fever all pulse rates at all ages tend to be the same.

The Bacteriology of Empyema in Children. — Bythell (*Journal of Pathology and Bacteriology*, July, 1904) finds that empyema in children is generally due to direct invasion on the part of the microorganisms from a patch of lobular pneumonia. The causative agent in a very large proportion of cases is the pneumococcus, which is most frequently present in a state of purity. A sero-purulent effusion is not inconsistent with the exclusive presence of pneumococci, nor a thick viscid pus with that of streptococci. The unmixed pneumococcic cases are, on the whole, the mildest, but the pneumococcus may, by dissemination, give rise to very dangerous complications; and, on the other hand, a streptococcal infection may result in very mild symptoms. Bacteriological examination affords the following information as regards the prognosis: (1) If the pus contains but a small number of poorly-stained microorganisms, and gives feeble cultures, the prognosis is generally good; (2) if the microorganisms are abundant and well stained, and the cultures vigorous, the prognosis is not necessarily bad, especially when there is a large amount of phagocytosis; if, however, the phagocytosis is poor or absent, the prognosis is almost always bad; (3) vigorous cultures are not in themselves a sign of pathogenic activity.—*British Medical Journal*.

Clinical Memoranda.

MARKED TUBERCULOSIS OF THE MESENTERIC LYMPH NODES IN ACUTE MILIARY TUBERCULOSIS, SECONDARY TO BASAL PULMONARY PHTHISIS WITH CAVITY, IN A BREAST-FED INFANT. PARTIAL AUTOPSY.*

BY F. M. FRY, M.D.,

AND

H. S. SHAW, M.D.,

Montreal, Canada.

History.—A female infant, W. G. G., aged twelve months, fed solely on the breast, was said to have suffered from cough and fever for some months. Cough had started at about six months after birth, and had occurred daily ever since this time. The child had, however, thrived fairly well until several weeks before death, when the parents were frightened by the rapid development of pallor and loss of weight, with marked vomiting.

Examination.—One of us (H. S. S.) now recognized signs suggestive of pleurisy (flat dullness, diminished fremitus, absent breath sounds) at the base of the left lung posteriorly, with fever. Exploratory puncture failed to show fluid. Dr. Blackader, a few days later, demonstrated that the liver and the spleen were greatly enlarged without ascites.

Seen on the day of death the patient showed nothing new. We felt the lower border of the liver quite as low as the umbilicus in the median line, and still lower in the right mid-clavicular line. What we took for the spleen was readily felt in the left hypochondrium.

Family History.—The parents were found free from any evidence of tuberculosis and there was no known history whatsoever of any tuberculosis in the entire family.

Diagnosis.—We felt that in a young child such marked en-

* See a paper by Weleminsky on the pathogenesis of pulmonary tuberculosis in the *Berliner klinische Wochenschrift*, 1905, No. 24 (June 12), p. 743.

largement of the liver and of the spleen was well-nigh never met apart from tuberculosis, and that such a diagnosis was suggested by the abdominal signs alone. But there was, too, an extensive chronic disease, apparently pleural, in the thorax, which was even more suggestive of tubercle. Moreover, there was fever, with rapid loss of weight and color. In spite, then, of the absence of tuberculous history, and although the child was breast-fed, we had no hesitation in diagnosing generalized tuberculosis.

Pathological Anatomy.—Permission for a partial autopsy was gained at which the following notes (F. M. F.) were made:—Body is much emaciated. On opening the abdomen the right lobe of the liver presents, extending to the umbilicus. The left lobe of the liver extends into the left hypochondrium, and is the mass which we had mistaken for the spleen. The liver's surface is smooth, apparently bloodless, and of the color of Gruyère cheese. On section, it is of the same appearance and leaves the knife greasy (extreme fatty liver).

There is no ascites, the peritoneum appears normal and there are no adhesions.

The spleen is considerably enlarged, brighter red and softer than normal, congested; showing on the surface are several tubercle-like masses about 1 mm. in diameter; on section one readily finds tubercles of about the same size.

The stomach and intestines show normal mucous membrane.

The kidneys are congested and show in the cortex on section numerous tubercles, the diameter of each being that of a pin-prick.

The mesenteric nodes form a great whorl of yellowish, hard, separate masses, the larger ones being nearly 1 cm. in length.

The left lung is adherent throughout its entire posterior and diaphragmatic surfaces, the adhesions breaking down with considerable difficulty. The lower two-thirds of the lung is solid, being the seat of massive caseation. Deep in the lung are several cavities, the largest being 4 cm. in diameter, globular in form, and half-filled with thick pus-like fluid. Several dozen bronchial lymph nodes are greatly enlarged, yellowish and caseous.

The heart is normal. The head was not examined.

Discussion.—These findings we were inclined to interpret as follows:—Death resulted from acute miliary tuberculosis, probably of several weeks' standing, and secondary to the pulmonary disease. The latter, judging by its extent and marked ulceration,

antedated by months the generalized infection which occurred by means of the lymph and blood stream. In the absence of any gross disease in the intestinal coats, mucous or peritoneal, it was probable that the marked mesenteric tuberculosis had not arisen from disease of the bowel, but was part of the systemic affection.

The points of interest were:—

(1) The pulmonary tuberculosis was basal and massive, with cavity, the last being deep and giving no physical signs—all features seen less rarely in young children than in adults.

(2) The case is one more example of infection rather than heredity as the all-important factor; (though no source of infection was found).

(3) The case is clearly one of respiratory infection in an infant, though at death abdominal tuberculosis co-existed. Had one seen only the abdominal cavity he might have been tempted to conclude in agreement with a doctrine still held by some, that the infection was alimentary.

Intestinal Tuberculosis in Children. — Richter (*Berliner Klin. Woch.*, November 7, 1904), who is attending physician to 1,200 coal miners' families, describes a somewhat unusual type of tuberculosis very common among the children of this class. It affects the intestinal and mesenteric glands, and though rarely fatal, forms an illness of much gravity. The patient's emaciate rapidly, lose appetite, are extremely pale, suffer from abdominal pain and tenderness about the umbilicus, headache, insomnia, and slight evening temperature. The cervical and submaxillary glands are frequently swollen. The disease often progresses very rapidly for a time, and then takes on a chronic type, which is apt to be more prolonged the older the child. After the subjective symptoms finally disappear, anemia, emaciation and general weakness persist for a long time. Most of the children affected are from one to four years old. The author ascribes the prevalence of the disorder to the fact that the milk supply of the region is of extremely poor quality, and that the hygienic conditions are also very deficient. In view of von Behring's statement that tubercular infection in childhood protects against reinfection later in life, it is interesting to note that tuberculosis is very rare among the adult inhabitants of this district.—*Medical Record.*

STRANGULATED INGUINAL HERNIA IN AN INFANT OF TWO MONTHS.*

BY EDWARD GUION, M.D.,
Atlantic City, N. J.

The case I report is one not met with very often in everyday practice. Because of this fact, and also because of the interest that has been taken in the case I take pleasure in presenting it to you this evening.

The patient, a male infant, was born at seven months' gestation, and admitted to the Infant Incubators at Atlantic City on June 10, 1905 (one day after birth); on admission its weight was 1,500 grams (three pounds). Six hours after admission the infant developed a severe case of ophthalmia neonatorum, the cornea of the right eye becoming ulcerated; a few days later the left eye became affected. In a few weeks this condition under the routine treatment cleared up.

After this the baby did well, gaining in weight every day, until August 10th (the day the baby should have been born), when I was called to see him about 11:30 P.M. The nurse informed me that the baby was fretful, refused to nurse and appeared to be suffering from pain. Prior to 11 P.M. he had been apparently in good health. Examination at this time showed distention of the abdomen and a tense and swollen scrotum; a mass could be easily detected in the scrotum on the right side.

The case was diagnosticated as "irreducible hernia," inasmuch as taxis failed to reduce the hernia; hot fomentations were applied during the remainder of the night.

The next morning I found the baby very much prostrated, pulse almost imperceptible, face pale, with vomiting, which later became stercoraceous, great distention of the abdomen, and the scrotal mass somewhat reduced in size. There was some bulging along course of canal; the extremities were cold. Constipation was absolute. The case was then diagnosed as strangulated inguinal hernia, and Dr. Emery Marvel was called in consultation. An immediate operation was decided upon and Dr. Marvel will give the technique of the operation.

REPORT OF OPERATION BY DR. EMERY MARVEL.

It was a simple matter to confirm the diagnosis made by Dr. Guion, but that which gave difficulty was to decide what was best to do, and how to proceed to do it. The frail, premature infant was a most unpromising subject for the operation, but without it the case seemed absolutely hopeless, for the baby was already list-

* Read before the Atlantic City Academy of Medicine, September 8, 1905.

less and with half closed eyes could be aroused only with difficulty.

One more attempt for reducing the hernia seemed justifiable, and this was made by bringing the legs upward and ventral, forming a half circle of the body, thus favoring gravity and traction for the displaced bowel, and also, relaxation of the inguinal structures. With this position sustained mild taxis was attempted and failed. The only other alternative for hope lay in operative procedure. In view of the weakened condition of the subject, which was already stupid, we deemed a general anesthesia extremely dangerous and inadvisable. The arms and legs were extended and held in position by two assistants with little difficulty. The field of operation was prepared immediately and an incision over the inguinal protrusion through the skin and subcutaneous tissue was made. With extra care the tissues were separated until the sac was reached. This was opened and a grooved director introduced through the canal of the sac into the peritoneal cavity. The director acting as a guide, the internal ring was reached and cut, which freed the bowel, and immediately the intra-abdominal pressure forced a considerable portion of the ileum, together with the cecum and appendix through the abdominal opening. The strangulated portion of the bowel was inspected and found to be greatly discolored, but in a condition that promised continued vitality. This, with the other protruded bowel, was replaced and retained with difficulty. The opening was closed by through and through sutures, no attempt being made to dissect out and bring together separately the delicate structures. The incision was covered with collodion and a gauze compress applied and held in position with adhesive plasters.

Four hours after the operation the baby was returned to the incubator nursery and immediately put to the breast of his nurse. He was allowed to take 60 grams (2 ounces), which he took with evident pleasure. The bowels moved the same day and a small amount of blood was noticed in the stools. The baby took his nourishment every two hours as usual (although the amount was cut down from 75 grams to 50 grams.) On the fifth day the wound was examined and found to be looking well. On September 3rd the wound was thoroughly healed without bulging. At this date, thirty-five days after the operation, the child weighs 3,500 grams (7 pounds).

The condition at this time gives promise for a radical cure, although we took little pains for this purpose at the time of the operation, considering principally the child's life.

SYPHILIS HEREDITARIA TARDA; REPORT OF A CASE.

BY LOUIS M. WARFIELD, M.D.,
St. Louis, Mo.

The manifestations of the syphilitic virus are so numerous and the periods of life at which hereditary syphilis may first show itself are so varied that it cannot be amiss to put on record the following case: first, because it is a comparatively late manifestation of hereditary lues; and second, because it shows one or two rather unusual features of the disease.

The patient, W. H., eleven years old, was brought to the Telfair Hospital Dispensary, Savannah, Ga., on February 4, 1904, complaining of catarrh of the head and swelling of the neck. The history obtained from the mother is as follows: Both parents are living and well. The mother has had three miscarriages, the fetuses being from the third to the sixth month. She has had no eruptions, no falling out of the hair, no sores in the mouth, no pains in the joints. This is the only child. There is no history of tuberculosis in the family.

The patient was born at term. He was a perfectly healthy child; he had no snuffles or rash of any kind and seemed in every way to be sound. Up to the age of seven years he was quite well and developed like other children.

When seven years old he had some febrile condition which was diagnosed as malaria. Two years ago he had measles, followed by pneumonia. He has had no other illnesses. His appetite is usually good, and the bowels, as a rule, are regular.

The mother dates the bad health of the boy from the attack of "malaria." During this attack, which she does not clearly describe, the child became blind, and for two years he could scarcely see with either eye. The mother tells a rambling story of how the boy nearly lost both eyes from inflammation. Finally the boy became gradually better, although it was two years before he could recognize objects distinctly. He suffered during that period with headache. About a year ago, while he was suffering from "catarrh of the head," he one day spat out a piece of bone which, he said, felt as if it had come from the back of his throat. The difficulty of breathing through the nose, of which he had com-

plained for some time, became worse, and he began to be deaf in both ears. About two weeks before admission another piece of bone came from the "back of the throat." There was no trauma, but since the last piece of bone came from the nose, the bridge of the nose has been swollen, especially on the right side. This became red and very painful to the touch.

About one year ago his neck began to swell. Later the swelling partly receded only to return and become larger than before. The swelling was painful; there was no trouble in swallowing. His appetite is fair; bowels regular; he has no trouble with micturition. He has occasional night sweats; no cough. He sleeps with the mouth open, snores, and occasionally has night terrors. He is very inattentive and is becoming daily more stupid.

On physical examination, the patient is seen to be a poorly nourished, pale boy of about the average height. The complexion is ashen; the expression staring and stupid; the nostrils are thick; the anterior nares are small and covered with crusts. The bridge of the nose is somewhat flattened, and on the right side beneath the eye, the tissues are swollen and red and very tender to pressure. The right pupil and cornea seem normal. The left pupil is irregular in shape, somewhat larger than the right, reacts to light and accommodation; there seems to be no adhesion. There is a uniform ground-glass appearance to the whole cornea. The patient says it seems as if there were a skin over the eye. The tongue is coated, the breath foul. The two upper central incisors are peg-shaped and slightly notched (Hutchinsonian teeth). In the hard palate are two slitlike perforations about 1 cm. long, through which a small probe can be passed to the nasal cavity. Farther back near the soft palate, but still in the mouth cavity, is a triangular-shaped perforation large enough to admit the tip of the little finger. The patient hears with difficulty; both ears are equally affected.

On both sides of the neck and beneath the chin are seen irregular projections representing markedly enlarged lymph nodes. The individual nodes are palpable, on the right side painful to pressure, and the overlying skin is reddened. The swollen nodes are felt in the posterior triangles of the neck and beneath the chin. The swelling extends on both sides beyond the ramus of the mandible, and the nodes vary in size from a pea to a hazel nut. At no point are the nodes adherent to the skin. The thorax is spare,

expansion fair and equal, lungs negative throughout. The heart is normal. The abdomen is flat, the liver is enlarged, the firm, fairly sharp, smooth edge is felt a finger's breadth below the costal margin in the right mammary line. The spleen is not palpable. In the right iliac fossa there is slight tenderness. In the left iliac fossa a rounded, sausage-shaped mass is felt. No pain on palpation. The patient's bowels moved before he came for examination. Genitalia appear normal. There is no elevation of temperature, pulse is regular, fair tension. The epitrochlear lymph nodes are with difficulty palpable. The axillary and inguinal nodes are enlarged and hard.

The diagnosis of hereditary lues was made and the mother was instructed how to use mercurial inunctions. Potassium iodid internally was also given.

February 9th.—The swelling on the right side of the nose has almost disappeared. The nodes in the neck are not so tender. The inunctions were begun only yesterday.

February 23rd.—The patient is wonderfully improved. The nodes in the neck are scarcely palpable; there is no tenderness. There is no improvement in the sight, but the patient says he hears a trifle better. His color is improving, the appetite is excellent. He did not return for observation.

It would appear from the history of this case that the attack of fever followed by blindness could not have been malaria, but was probably the beginning of the manifestations of the infection with the syphilitic virus. There was probably an iritis as well as a keratitis. The eye conditions are essentially late manifestations of the disease and although they usually occur about the time of puberty, may occur earlier. The ear lesions, which are, as a rule, labyrinthine in character, are not so commonly seen as the eye lesions, although, according to Hutchinson and the French authors they form a very characteristic symptom of late hereditary lues. The deafness comes on as a rule rapidly and is permanent, although slight improvement may take place under treatment. Examination of the external ear and drum membrane shows no change.

In this case the bone lesions are confined to the bones of the face. More often nodes are seen on the tibiæ. The lesion is a gummatous periostitis, which leads to great thickening of the bones, and sometimes, as in the present case, necrosis follows,

causing loss of portions of the bony structure, with consequent false openings between the several cavities. Virchow gave the name "caries sicca" to the lesions occurring in the bones of the face. The characteristic feature of these changes is the discharge from time to time of small pieces of necrosed bone without hemorrhage of any extent.

An interesting feature of the case is the fact that the child showed absolutely no symptoms, if the history is correct, until the seventh year. As a rule, shortly after birth or even at the time of birth, certain skin lesions are noticed, which may eventually clear up completely and the disease then remains latent only to appear again about the time of puberty.

It is difficult to decide at times, in cases of lues hereditaria tarda, whether the condition is due to acquired or hereditary lues. There are, however, enough careful observations on record to show that such lesions may occur in hereditary lues without any of the symptoms noticed as a rule shortly after birth. The condition as shown in the present case is quite characteristic and corresponds to the so-called tertiary stage of the acquired form. It is well known that visceral lesions may occur in the acquired form years after the primary sore, where there were either no secondary symptoms, or the secondary symptoms were so trivial that the patient had no recollection of them.

That this case is one of late manifestation of hereditary lues and not one of acquired lues is, I think, shown by the history of miscarriages in the mother. There were three miscarriages before the child was born. The probability is that the infection of the mother occurred at the time of the first conception. At each subsequent pregnancy the virus became milder until at the fourth an apparently healthy child was born. That the infection was, however, still active although latent is shown in the subsequent history of the case.

In this connection the following quotation taken from Holt's text-book is of special interest: "In a case recorded by Bertin, in the first pregnancy the child died at the sixth month; in the second, at the seventh month; in the third, at seven and a half months; in the fourth the child was born at term and lived eighteen days; in the fifth it lived six weeks; in the sixth, the child lived four months without treatment."

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ARCHIVES OF PEDIATRICS.

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PROPHYLAXIS OF OPHTHALMIA NEONATORUM FROM THE STANDPOINT OF THE OBSTETRICIAN.

In a very small proportion of cases, ophthalmia neonatorum begins *in utero* and is not amenable to prophylaxis. Disregarding this contingent, we have two methods of prevention at our disposal, viz.: (1) treatment of actual or suspected gonorrhea of pregnancy, which is well understood by the modern obstetrician and need not be discussed in this connection, and (2) instillation of some bactericidal solution into the conjunctival sac at birth.

The preparations employed for this purpose are limited by common experience to silver salts, either the inorganic nitrate, the use of which was reduced to a system many years ago by Credé, or the organic silver combinations, protargol and argyrol, which are comparatively of recent introduction. These substitutes for Credé's method have secured not a few champions, and it is by no means easy to decide offhand as to the relative merits of the old and the new, or whether one has special indications which the other cannot fill.

Personally the writer has every faith in Credé's method in both private and hospital practice. The 2 per cent. strength, as recommended by Credé, the writer finds to be the ideal solution; for if weaker, the bactericidal power is diminished, while if stronger (say 3 per cent.) there is some likelihood of causing the harmless, but undesirable, "silver catarrh." The writer is so firm a believer in Credé's method that he ascribes unsucccess in its use either to antepartum infection or defective technique.

Antagonism to the use of Credé's method is of comparatively recent development, irrespective of the use of substitute procedures. Some of it rests upon the claim that it has not been properly carried out, especially by midwives; as shown incidentally by the fact that the frequency of gonorrheal blindness has not been sufficiently reduced. Not a few obstetricians have found the so-called "silver catarrh" a drawback, and this accident has doubtless led to the introduction of substitute procedures. While some authorities have adopted protargol and argyrol, others have sought to modify the original Credé method by using solutions of weaker strength or perhaps by neutralization with sodium chlorid.

Hofmeier, Runge, Fehling, Gusserow and others have been using a 1 per cent. solution of nitrate, and have thereby almost eliminated silver catarrh, while at the same time practically preventing ophthalmia. Hofmeier's remarkable results in 5,000 cases—only 0.33 per cent. of morbidity—may have been due to the fact that he is one of the few who believe in and practice routine antepartum douching in all confinement cases.

In this connection it must not be forgotten that before Credé's method was introduced, general asepsis had greatly reduced the frequency of eye-morbidity in the newly born. When puerperal fever used to exist in epidemics, 50 per cent. of eye morbidity co-existed. This should teach us that we cannot judge of the relative merits of methods for prophylaxis of ophthalmia neonatorum without taking into account the practice of the obstetrician as to antepartum douching and similar measures directed to the mother.

In regard to the question of separate indications for the nitrate and other salts, Wintersteiner cites a class of cases of late development, which have either been latent or due to post-partum infection. Credé's method, applied at birth only, cannot prevent such cases. Hence he would use it continuously throughout the puerperium twice daily.

When it comes to a question of statistics, the enormous figures compiled by Alvarado von Rosthorn and others in which Credé's method was used, can hardly be paralleled by advocates of the organic salts as to results. Smaller totals (Leopold's 3,000) without a single case of ophthalmia speak with equal eloquence in support of Credé's method.

As far as known Rubesca's figures of 1,100 cases treated by protargol are the largest compiled for an organic salts. Two cases only of ophthalmia developed. This is good work but inferior to Credé's statistics with a much larger material.

In regard to the number of partisans of the old and the new methods respectively, Alvarado, by sending out circulars of inquiry to European ophthalmologists, obtained 31 answers; and in every clinic but one Credé's method was still in use.

In conclusion, the writer repeats what he has stated as to his complete satisfaction with Credé's method; but he would add that he has given both the organic salts a fair trial, and have found them inferior to the 2 per cent. solution of silver nitrate.

J. CLIFTON EDGAR.

FAREWELL.

With the close of this volume of *ARCHIVES OF PEDIATRICS* the present editor retires. He has been fortunate in having the efficient association of Dr. L. E. La Fétra, Instructor in Pediatrics at Columbia University, who will have editorial charge and under whose guidance the future of *ARCHIVES* will be assured.

As successor to Dr. Crandall, the editor began his duties in 1900 with many misgivings lest he should fail to secure the good will and cooperation of the collaborators, but as the work of his predecessor had been laid on such broad lines he soon learned that he had not only the support of the comparatively small circle of pediatricians, but also of a large number of representative professional readers and influential medical journals. He was fortunate to secure valuable papers from eminent authorities in pediatrics, both in America and England and had, for some time, the publication of the proceedings of the London Society for the Study of Disease in Children, as well as of special American societies whose transactions are so favorably known to the readers of *ARCHIVES*. He was early made aware that the general practitioner takes a lively interest in all the subjects relating to the diseases of children. It was also evident that the contributors of special papers recognized this interest of the general practitioner and did not limit their articles to technical details, but put them in such form as to make them most helpful to the physician whose clinical facilities were limited.

Pediatrics is often the largest part of the practice of the family physician, and to every medical man come many cases concerned directly with the processes of disease, nutrition and of hygiene associated with infancy and childhood. It is not a specialty of limited application, but it is a branch of general medicine, most important in that it deals with the care of infants and children and thus, with well directed supervision, prepares them for normal physical development.

Pathological changes as studied in adult life cannot alone make clear the full meaning of the growth, repair and nutritional disturbances which are so complexly interwoven with the period before adolescence. The diseases incident to childhood are so numerous that an elaboration of them would leave very few in the list now considered under the title of "general medicine." Thorough knowledge of the morbidity of childhood not only leads to more exact knowledge of all pathological processes but also to a fuller appreciation of the conservative influence exercised by nature in the evolution of cells during the time of the greatest bodily growth and development.

To advance this knowledge of, and interest in, pediatrics is the object of *ARCHIVES OF PEDIATRICS*, and its readers will be kept abreast of the progress of medical science by the intelligent oversight of Dr. La Fétra.

The editor desires to express his thanks to the collaborators, readers and professional friends who for the past six years have rendered him invaluable service in his endeavors to maintain *ARCHIVES* as an unbiased and representative publication.

Appreciation is given gladly to those medical periodicals which by their high standard are a moral force against the influence of commercialism in medicine.

To the publishers of *ARCHIVES OF PEDIATRICS*, Messrs. E. B. TREAT & COMPANY, the editor extends his thanks for the pleasant personal intercourse that he has enjoyed with them and for their policy of allowing editorial prerogative its place in the management of the journal. Under such auspices the medical profession may be sure that the publication of *ARCHIVES* is in safe hands and that the editor is free to exercise his best judgment in its conduct.

Bibliography.

Clinical Treatises on the Pathology and Therapy of Disorders of Metabolism and Nutrition. By Professor Dr. Carl von Noorden, Physician-in-Chief to the City Hospital, Frankfort-on-Main. Authorized American translation. Edited by Boardman Reed, M.D. Translated by Florence Buchanon, D.Sc., and I. Walker Hall, M.D. Part VII. **Diabetes Mellitus.** Its Pathological Chemistry and Treatment. Lectures delivered in the University and Bellevue Hospital Medical College, New York. Herter Lectureship Foundation. New York: E. B. Treat & Co. Pp. 211. 1905. Price, \$1.50.

In this volume Professor von Noorden presents the lectures on diabetes which he gave before the class of the University and Bellevue Hospital Medical College. He considers first the pathogenesis of glycosuria, describes the acetone bodies, elaborates the general course and prognosis of diabetes, and gives his method of treatment, with an appendix containing food tables.

He states as his conclusion that there are cases in which the consumption of sugar and its transformation into fat are both simultaneously impaired, glycosuria of different degrees of severity and wasting, commonly resulting. This is the commonest form of diabetes.

There are cases in which only the consumption of sugar, but not the synthesis of fat, is impaired: obesity, but no glycosuria, is the result. "These cases develop later into a third class in which the consumption of sugar is diminished and the storage of carbohydrate in the fat masses is also suffering a moderate and gradually progressing impairment." These are cases of obesity with superadded glycosuria and constitute the common form of diabetes in the obese.

He expresses his opinion that in the so-called pancreatic diabetes there may be severe disturbances of the chemical function of the organ without any macroscopic pathological change.

The author's writings on metabolism have been so well received that there can be no doubt but that the present volume will meet with an equally cordial reception. The book will be of service especially to those members of the profession who have the care of diabetic patients and who make a careful and thorough analysis of their cases.

Neurotic Disorders of Childhood. Including a Study of Auto and Intestinal Intoxications, Chronic Anemia, Fever, Eclampsia, Epilepsy, Migraine, Chorea, Hysteria, Asthma, etc. By **B. K. Rachford, M.D.**, Professor of Diseases of Children, Medical College of Ohio, University of Cincinnati; Pediatricist to the Cincinnati Good Samaritan and Jewish Hospitals, Member of American Pediatric Society, Association of American Physicians, etc. New York: E. B. Treat & Co. 1905. Pp. 440. Price, \$2.75.

In 1893 and 1894 the author published a series of papers in the *ARCHIVES OF PEDIATRICS* entitled "Some Physiological Factors of the Neuroses of Childhood." With these papers thoroughly revised, the author has extended them into a volume in which he treats of the physiological peculiarities of the immature nervous system in infants and children and records the bearings which these peculiarities have in producing special types of neuroses in childhood. He defines "neuroses of childhood" as a term which is used to cover all local and general nervous disorders which do not depend on any known pathological lesions of the nervous system. This definition does not imply that the diseases have an entirely unknown pathology but that they cannot be morphologically classified. Starting with this explanation he describes the normal function of nerve cells, the physical peculiarities of the nervous system during infancy and childhood, the physiological factors of the high fevers and high temperatures of children, gastrointestinal toxemia, autointoxication, chronic systemic bacterial toxemia and reflex irritation. In the second part of the book the chapter headings include fever, eclampsia, tetany, enuresis, recurrent vomiting, recurrent coryza, chorea and disturbances of sleep. Following the work of his earlier papers the author reverts to the physiological chemistry of the toxemia found in so many of the children who show symptoms of irritability and autointoxication. While unquestionably some of these hypotheses have not been fully worked out, their elaboration, even in a theoretical way, has an important bearing on proper consideration of the numerous causative factors concerned in the neuroses of childhood. The author is certainly not ultra in his views and makes practical deductions from some of the theories advanced. Clinically the volume has much to commend it, as there is a definite view of underlying causes and all the conditions described are described as symptoms, not diseases, while importance

is attached to all methods of treatment directed to a correction of the faulty constitutional state which produces these symptoms. He reports a number of cases from his personal experience and these, taken in connection with the eminently practical character of the book, add materially to its interest and value.

The volume presents an eminently sane and physiological exposition of the neuroses observed in infancy and childhood. It is a book to be read as supplementary to those works that deal with organic diseases and it is unique in its own field, which covers the ground of the conditions which we rather loosely call reflex nervous disorders. Besides being a book for physicians it should be read by school teachers who have, unfortunately, only a slight appreciation of the reflex disorders of childhood. The volume is attractively printed and has a good index.

Medical Treatment of Tubercular Peritonitis.—Miserocchi (*Gazzetta degli Ospedali*, Vol. XXV., No. 34) reports 14 cases of tubercular peritonitis cured by medical means alone. His experience has been still larger than this, but he mentions only those cases in which the interval since has been long enough to speak of a permanent cure. Measles or pertussis had preceded the tuberculosis in more than 78 per cent. of the cases. This confirms Rander's figures. He found measles or pertussis, or both, in the antecedents of 83 per cent. of 352 tuberculous children. Miserocchi emphasizes this fact as of preponderant importance for the prophylaxis of tuberculosis. In 8 of his 14 cases there was ascites; in 4 a mixed, fibrous-ascitic-caseous form, and in 2 the fibrocaceous form. Treatment was by the use of iodine internally and externally. The children were put to bed and given a milk diet at first, with disinfection of the digestive tract, plenty of fresh air and gradually increasing nourishment to forced feeding. The children were cured as a matter of course, even when merely out-patients, both in cases in which the peritonitis was the only manifestation of the disease and also in those in which the pleura or lungs were probably affected. Iodo-tannic syrup was given internally with an iodoiodid salve rubbed into the abdomen. The ascites was absorbed and the palpated nodules retrogressed. The communication issues from Cattaneo's clinic at Parma.—*Journal of American Medical Association*.

Current Literature.

--- PATHOLOGY.

Hastings, T. W.: The Bacterial and Cellular Examination of the Spinal Fluid in 50 Cases of Cerebrospinal Meningitis. (*Medical News*, June 17, 1905, p. 1,110.)

The amounts of fluid varied from 5 to 60 cc. They were examined as to their macroscopic appearance, cellular content and bacterial content. For macroscopic examinations the fluid should be in two or three sterile centrifugal tubes. The fifty acute, non-tuberculous specimens showed a turbid fluid with flakes and fibrin, while 5 tuberculous cases showed a clear fluid with merely a veil coagulum. The cellular examinations showed leukocytes, usually polynuclear.

On bacteriological examination 42 cases were found to be due to the meningococcus. These all had a higher polynuclear count. Five cases were due to the pneumococcus. Five cases were due to the tubercle bacillus and showed a high mononuclear count. In 3 cases no bacteriological examination was made.

Curl, Sydney W.: Blood Changes in Meningitis in Children. (*The Lancet*, May 6, 1905, p. 1,187.)

The author discusses the blood of normal children and tabulates his results from the examination of 10 cases of meningitis. He concludes that in tuberculous meningitis in children, (1) the red corpuscles are normal or increased in number; (2) the majority of cases show no leukocytosis; (3) the eosinophile cells are reduced in number; and (4) the large lymphocytes and transitional cells are usually present in increased proportions.

Councilman, W. T.: Acute Meningitis. (*Journal of the American Medical Association*, April 1, 1905, p. 998.)

The writer carefully discusses the anatomy, bacteriology and pathology of acute meningitis and concludes that infection of the meninges may occur through the blood vessels, the lymphatics or by direct continuity of tissue. The usual source of infection is the nasal mucous membrane. He shows that the diplococcus intracellularis is the cause of epidemic meningitis, and while it cannot exist as a saprophyte it can live on a healthy mucous membrane. This diplococcus causes a thick fibropurulent exudate. The membranes and cortex show a great increase in the number of

endothelial cells and there is a degeneration of the ganglion cells. The spinal nerves are the seat of an acute purulent neuritis that causes a destruction of the sheath and a softening of the fibres. This is especially true of the second, fifth and eighth cranial nerves. In chronic cases the meninges are greatly thickened and by closing the foramen of Magendie may cause a chronic hydrocephalus.

Charrin and Le Play: Intrauterine Rachitis. (Académie des Sciences, Session of January 30. *Annales de Méd. et Chir. Inf.*, February 15, 1905, p. 139.)

The lesions of intrauterine rachitis, a morbid entity the existence of which many authors deny, are by some regarded as attributable to achondroplasia. Photographs and radiographs and the results of macroscopic and microscopic examinations and chemical analysis, together with the skeleton presented, furnish proof of the existence of fetal rickets. The specimens were obtained from a newborn child, premature at eight months, who lived but two days and who at birth showed the characteristic lesions: rosary, craniomalacia, enlarged epiphyses, etc. The mother of the child was forty-seven years old, but appeared to be older, her vitality having been exhausted by eleven pregnancies. She had been subjected to privation which engendered an acid dyscrasia which led to a solution of the phosphates. Penetrating the placenta the acid principles acted upon the bones of the fetus. The pathological condition dated from the time of conception.

Onuf, B.: Some Interesting Autopsy Findings in Epileptics. (*Journal of the American Medical Association*, April 29, 1905, p. 1,325.)

The brains were preserved by subdural injections of a 12 per cent. solution of formalin. This preserved and hardened the material perfectly. Of the cases examined, 80 per cent. showed valvular lesions of the heart, the mitral valve being most often affected. The capillaries of the lungs and kidneys were dilated and tortuous. In 10 cases the pia over the hemispheres was markedly thickened, especially over the fronto-parietal lobe. The arteries at the circle of Willis were thick and irregular in many cases. There were found cases of local atrophy at the right frontal lobe, subdural hemorrhage over the motor areas and internal hydrocephalus. One case of cerebellar cyst was en-

countered. In three there was shrinkage of the cerebellar convolutions. Several cases of atrophy of the thalami and corpora quadrigemina were discovered. In these the irritation that caused the epilepsy was the inflammation that resulted in the atrophy.

MEDICINE.

Pasteur, W.: On Pneumococcal Sore Throat with Notes of a Fatal Case. (*The Lancet*, May 27, 1905, p. 1,409.)

The author reviews the literature and states that pneumococcal pharyngitis is much more frequent than is generally understood and must be thought of in connection with diphtheria.

A boy three and a half years old was suddenly taken ill with sore throat, pain on swallowing and persistent high fever. His face was pale, with a dusky molar flush. The skin was dry and hot; temperature 103° F. The uvula, soft palate and fauces were slightly edematous and very red. The tonsils were swollen and injected: diphtheria antitoxin was given, but without results. The glands at the angle of the jaw were enlarged and tender. The pharynx became covered with sloughs and the boy died on the twenty-second day. Autopsy showed an extensive gangrene of the pharynx and a diffuse gangrenous bronchopneumonia of the left lung. The pneumococcus was present in pure culture.

Calwell, W.: Observations on Dwarfism and Infantilism. (*British Medical Journal*, June 24, 1905, p. 1,376.)

The author presents two living patients and a skeleton.

CASE I.—A male, aged twenty-one years. Height, 4 feet $4\frac{1}{2}$ inches. Weight, 4 stone $7\frac{1}{2}$ pounds. The relative size of the trunk and limbs is normal. The abdomen is somewhat full. He has no facial, axillary or pubic hair. Both tibiae are bowed, swollen and tender. He has not the mental power of a man of twenty-one years. The pains in the legs improved under douches and massage. The epiphyseal cartilages are present in the arms. His hair is becoming gray. Neither thyroid nor pituitary extract produced any improvement.

CASE II.—A female, aged twenty-six. Height, 3 feet 8 inches. Weight, 3 stone 10 pounds. She has excessive scoliosis, with same lordosis. She is sexually mature and has a normal pelvis and genital organs.

CASE III.—The skeleton is typical of achondroplasia.

Miller, James Alexander: Nephritis Complicating Mumps. (*Medical News*, April 1, 1905, p. 585.)

The patient, a four year old boy, had a bad family history. Two grandfathers and his grandmother died of Bright's disease. His father and mother had acute nephritis but are now normal. His sister had acute nephritis complicating scarlet fever. An elder brother had scarlet fever and measles without any nephritis. On January 17th the patient developed a double parotitis. This was accompanied by cloudy, scanty urine and swollen eyelids. On January 28th the urine was smoky, greenish, contained considerable amorphous sediment; acid reaction; specific gravity, 1.022; albumin, 5 per cent.; urea, 1.9 per cent.; many granular and pus casts and red and white blood cells. Quantity in twenty-four hours, 12 ounces. On February 2d a well marked rash of measles appeared. On February 8th the urine was normal. The author reviews 29 similar cases and concludes that acute nephritis may complicate parotitis in adults or children and is more frequent in males. The nephritis occurs early in convalescence, is severe, of short duration and usually ends in complete recovery.

Steven, John Lindsay: Case of Enlargement of the Spleen and Liver in a Child. (*Glasgow Medical Journal*, July, 1905, p. 14.)

A child of two years had been listless and fretful for eight months. Four months later the abdomen became enlarged. She vomited occasionally. One brother died at seven years of age after three years of vomiting and splenic enlargement. On examination the spleen was found to extend into the pelvis. The liver was also enlarged. The author thinks this may be a case of Banti's disease.

Coutts, J. A., and Rowlands, R. P.: A Case of Purulent Pericarditis in an Infant; Operation; Death. (*British Medical Journal*, April 15, 1905, p. 816.)

The patient, twenty months old, was rachitic and had pneumonia following measles. Soon after admission pericardial dullness appeared and fluid was aspirated. The pericardium was exposed by rib resection, incised and sutured to the skin. There was a small amount of pus. Rubber drains were placed in the pericardial sinuses and the wound dressed. The child died in two days. On autopsy, laryngeal diphtheria was found in addition to the other lesions.

Holt, L. Emmett: Gonococcus Infections in Children, with Especial Reference to their Prevalence in Institutions and Means of Prevention. (*New York and Philadelphia Medical Journal*, March 18, 1905, p. 521.)

Dr. Holt, after a very careful study of the conditions existing in the institutions for children concludes that:—

(1) We must recognize gonococcus vaginitis as a very frequent disease and one to be constantly reckoned with in institutions for children. It is also very frequent in dispensary and tenement practice and not uncommon in private practice of the better sort.

(2) In its milder forms and in sporadic cases it is extremely annoying because so intractable; in its severe form it may be dangerous to life through setting up an acute gonococcus pyemia or infection of the serous membranes, and in its epidemics forms a veritable scourge in an institution.

(3) The highly contagious character of gonococcus vaginitis makes it imperative that children suffering from it should not remain in the same wards or dormitories with other children. A similar danger, though less in degree, exists with the gonococcus ophthalmia and acute gonococcus arthritis or pyemia.

(4) It is practically impossible to prevent the spreading of the disease if infected children remain in the same wards with the others. They must either be excluded from the hospital or if admitted be immediately quarantined.

(5) Cases of gonococcus vaginitis can only be excluded from hospital wards by the systematic microscopic examination of smears from the vaginal secretion of every child admitted. If a purulent vaginal discharge is present such examinations are imperative and should be made as much a matter of hospital routine as the taking of throat cultures in children with tonsillar exudates. In the absence of microscopical examination a purulent discharge in a young child may be assumed to be due to the gonococcus.

(6) The quarantine to be effective must extend to nurses and attendants as well as children. Furthermore, the napkins, bedding and clothes of infected children must be washed separately from those of the rest of the house.

(7) Where the gonococcus is found with no, or a very slight, vaginal discharge, children should also be quarantined, although it is impossible at present to say to what degree such cases may be dangerous in a ward. One of the most difficult things in con-

nection with the gonococcus vaginitis is the prolonged quarantine rendered necessary by the fact that these cases are very chronic and very resistant to treatment.

(8) The danger to nurses from accidental infection, especially of the eyes, is considerable. At the present time they are not sufficiently instructed in this respect.

Ashby, Henry : Some Thoughts on Convulsions During Infancy and Childhood. (*The Lancet*, January 21, 1905, p. 135.)

The author thinks that the main predisposing causes of convulsions in children are: rickets and neurotic parents. Convulsions from cerebral injury or hemorrhage are quite rare and many cases are so diagnosed that are really due to gastrointestinal disorders. Speaking of dentition as an excitant of convulsions, he is inclined to disregard the fact of teething and would look again to the gastrointestinal tract. Syphilitic softening of the brain is a frequent cause of convulsive attacks. He refers at length to those cases in which the convulsions are due to, or are followed by, some permanent lesions. In speaking of the treatment of convulsions he favors chloroform, morphin, chloral and the bromids.

SURGERY.

Dun, R. C.: A Note on Appendicitis in Children. (*Glasgow Medical Journal*, June, 1905, p. 410.)

The author thinks that appendicitis is much more frequent in children than is generally understood and that the impression that children are liable to more serious attacks than adults arises from the fact that they do not come to the attention of the surgeon in the mild stages. The usual symptoms are: Abdominal pain, colicky, usually referred to the umbilicus; slight right iliac tenderness; nausea, with vomiting; flatulence, tenesmus and diarrhea. In more severe cases there is in addition a rise of temperature, and there is rigidity. Colic and acute indigestion have to be excluded. The stage of peritonitis and abscess formation gives the usual adult symptoms, with the additional complaint of frequent and painful micturition. Rectal examination should be made. A leukocytosis of over 15,000 indicates pus. In the mild cases the patient should be kept in bed on a fluid diet. If the attacks recur it is best to operate. In suppurative cases operation is the ra-

tional treatment, and in gangrenous and ruptured cases the only treatment. Opium and purgatives are dangerous and should be avoided.

Whipham, T. R. C., and Fagge, C. H.: A Case of Congenital Stenosis of the Lower End of the Esophagus. (*The Lancet*, January 7, 1905, p. 22.)

A four-and-one-half-year-old girl was admitted to the Evelina Hospital with a history of having vomited soon after eating since infancy. Examination by the x-rays and by bougies showed a stenosis of the lower end of the esophagus. An anesthetic was given and dilatation was attempted. Soon after this the tissues of the neck became emphysematous. A marked rise of temperature followed and the child died in three days. There was a firm fibrous stricture one and one-half inches from the cordia. Above this the esophagus was dilated. The stylet used had perforated the esophagus high up and entered the mediastinum.

Neubauer, A.: Papilloma of the Larynx in Children and its Treatment. (*Jahr. für Kinderh.*, Vol. XLI., Nos. I. and II., 1905, p. 21.)

The extensive literature upon this subject is the best proof of the frequent occurrence of papilloma of the larynx in children. According to Cansits' "*Handbuch der Laryngologie*," papilloma is not of very rare occurrence.

Neubauer reports 5 cases operated upon by him since 1897, in the Adele Brody Hospital for Children. Children of three years or more are examined in the same manner as adults, the tongue being held firmly by two fingers. Instruments, such as gags, tongue-pincers, etc., must be employed in the examination of young children—here cocain anesthesia is also necessary. The papilloma can be removed by extra- or intralaryngeal methods, both of which have their adherents. Bruns put an end to contention upon this subject by formulating the following principles:—

(1) Thyrotomy is not in itself a dangerous operation, nor does it present technical difficulties, but it very greatly endangers the integrity of the voice. Cleavage of the entire thyroid furnishes a very small aperture through which it is difficult to remove multiple new growths or those having broad bases. (2) It is only permissible to open the larynx when a skilful laryngologist pronounces it to be impossible to remove the new growth in any other way. (3) The laryngoscopic method has been so

successful in children that it should, whenever possible, be preferred. In 1884 the use of cocain, as advised by Jelinek, furnished a method of temporarily anesthetizing larynx and pharynx, and by these means the chief obstacles to laryngoscopic examinations and endolaryngeal operation were removed. In the cases reported by Neubauer the endolaryngeal operation was readily performed. He is decidedly of the opinion that in cases of papilloma of the larynx in children the endolaryngeal method should invariably be tried.

Kelemen, David: A Case of Echinococcus of the Liver Cured by Bacelli's Method. (*Archiv. für Kinderh.*, Vol. XLl., Nos. I. and II., 1905, p. 18.)

Kelemen describes a case of echinococcus of the liver in a girl of six years. Bacelli first published his mode of treatment in 1887, attracting but little notice. In 1894 he once more called the attention of the medical world to his simple and safe method which consists in introducing a 1-1,000 sublimate solution after evacuating the cyst by aspiration. In the case reported by Kelemen the cyst refilled in three weeks' time, so that the liver enlargement equalled that noted upon admission. The operation was repeated; this time the cyst was only partially evacuated—32 cc. of the fluid were removed and 20 cc. of 1-1,000 sublimate solution injected. This process was twice repeated within a month. Two months after dismissal of the patient the liver was of normal dimensions. Failure in the first instance is described as having been due to the fact that collapse of the completely emptied sac prevented the sublimate solution from coming in contact with all portions of the cyst wall.

Marique: The Surgical Treatment of Meningitis. (*Annales de Méd. et Chir. Inf.*, No. 23, December 1, 1904, p. 317.)

The writer deplors the pessimistic attitude of the profession with regard to the treatment of meningitis, and thinks that in improved surgical methods will be found a means of ameliorating symptoms and possibly of cure. Marique briefly relates the results which have thus far been obtained chiefly in cases of cerebrospinal and tubercular meningitis.

(1) Spinal puncture (lumbar or cervical). (2) Lumbar puncture with drainage. (3) Lumbar puncture with injection of remedial solutions. (4) Simple trephining. (5) Trephining with incision of the dura mater. (6) Trephining with ventricular

puncture. (7) Trephining with drainage of the subarachnoid space. (8) Trephining with ventricular drainage.

The suggestion of Poncet that Koch's tuberculin be injected after preliminary craniectomy should also be noted. Lannelongue, in a case of tubercular meningitis, trephined in four places: the frontal and occipital regions on either side. Irrigation was established, a solution of 1-10,000 having been used. The patient died. In 1894 Lannelongue suggested the use of oxygen as a substitute for the sublimate solution. The writer thinks experience thus far teaches that trephining, with drainage of the subarachnoid space, promises the best results, recovery having followed in 2 out of 6 cases. Two methods are in vogue—that of Morton and that of Caipault. The latter is the simplest, and Terrier considers it to be the treatment of the future for cases of tubercular meningitis.

HYGIENE AND THERAPEUTICS.

Hall, G. Stanley, and Taylor, J. Madison: Adolescence. (*The Monthly Cyclopedia of Practical Medicine*, June, 1905, p. 241.)

These authors state that adolescence is a period when young people have not entirely escaped liability from many of the disorders of infancy and childhood, and when many of the diseases of maturity have not acquired their full strength. Adolescents are then especially liable to slight ailments that may, at this impressionable period, cause a subtle perversion or arrest in cell growth. On this ground they urge that the education of adolescents and their medical treatment should receive especial attention.

Griffith, J. P. Crozer: Diet After the First Year. (*American Medicine*, February 4, 1905, p. 195.)

Nursing infants should be taught to take water or modified milk from a bottle at least once a day. By this means the child becomes accustomed to taking food from the bottle and at the age of ten months or a year can be put on increasing strengths of diluted milk. At this period it is wise to add a small amount of barley or arrowroot jelly. The feedings may be from three to four hours apart.

At the age of one year porridge may be given from a spoon, and milk from a cup, at noon. Any porridge but oatmeal may be given. The food should be well cooked and salted. Bread and milk or milk toast are allowed. When the child gets used to the porridge it may be shifted to breakfast and some rice, bread or macaroni moistened with beef juice may be given at noon with a glass of milk in addition. At fourteen months eggs may be tried. Orange juice is of value even earlier. At eighteen months finely chopped meat may be given with a little mashed baked potato.

Diet from one year to eighteen months.—Breakfast (6-7 A.M.): (1) A glass of milk with bread in it or a good breakfast food; (2) cereal and milk mixture; (3) a soft-boiled or poached egg, with bread and milk. Second meal (10 A.M.): A glass of milk. Dinner (1:30-2 P.M.): (1) Bread and gravy, beef tea, a glass of milk; (2) rice or grits with gravy, a glass of milk; (3) soft-boiled egg, stale bread and butter, a glass of milk. Rice, sago or junket may be used in addition. Fourth meal (5 P.M.): Milk or bread and milk. Fifth meal (9:30 P.M.): A glass of milk.

Diet from eighteen months to two years.—Breakfast: (1) Milk with bread and butter or a cracker; (2) a soft-boiled egg with bread and butter and a glass of milk; (3) porridge. Second meal: (1) Bread and milk; (2) bread and butter or a soda cracker and milk. Dinner: (1) Boiled rice, baked potato moistened with gravy or beef juice, a glass of milk; (2) mutton or chicken broth with barley or rice, bread and butter, sago and rice pudding made with milk; (3) a small amount of minced white meat or rare roast beef, lamb or fish, bread and butter, a glass of milk. Fourth meal: (1) Bread and milk; (2) bread and butter and a glass of milk.

Diet after the second year.—Breakfast: (1) Beefsteak with oatmeal or other cereal and milk; (2) a soft-boiled egg, bread and butter and a glass of milk. Second meal: (1) A glass of milk with bread and butter or cracker; (2) bread and milk; (3) chicken or mutton broth. Dinner: (1) Roast fowl or mutton or beef cut fine, mashed baked potato with butter or gravy, bread and butter; as desert, rice or sago pudding, junket, small amounts of berries, orange juice, stewed prunes or apples. Supper: (1) Bread and butter; (2) milk and cracker.

After three years almost anything can be taken, but certain

foods are to be used cautiously and others avoided. To be taken with caution: Kidney, muffins, hot bread, sweet potatoes, baked beans, squash, turnips, parsnips, carrots, egg plant, tomatoes, green corn, cherries, plums, apples, huckleberries, gooseberries, currants. To be avoided: Fried foods, pork, sausage, pastry, heavy or sweet puddings; turnips, sour or stale fruit, bananas, pineapples, cucumbers, raw celery, tomatoes, cabbage, cauliflower, nuts, candy, preserves, jams, tea, coffee and alcohol. Feeding except at regular times is to be avoided, as is "stuffing" with cakes and candy.

Agatson, Sigmund, A.: A Case of Cerebrospinal Meningitis, Lumbar Puncture, Purulent Cerebrospinal Fluid; Perfect Recovery. (*New York and Philadelphia Medical Journal*, February 4, 1905, p. 231.)

A boy, sixteen years old, was taken with chill, fever, headache, projectile vomiting, drowsiness and mild delirium. This lasted one day and left him languid. Five weeks later he suddenly went into a stupor. A purpuric eruption appeared over the trunk and limbs. Pulse 100, temperature 104°F. Following this the usual symptoms of cerebrospinal meningitis developed. Thirty-five cc. of thick purulent fluid were obtained by lumbar puncture. From this on the patient improved.

Eve, Frank C.: A Cerebrospinal Manometer. (*The Lancet*, April 22, 1905, p. 1,067.)

The instrument consists of a lumbar puncture needle connected with a graduated glass tube and with an outlet tube. Under asepsis the needle is introduced and the fluid is then allowed to flow into the manometer until the maximum height is reached. The outlet tube is then opened until the desired amount is withdrawn. The writer thinks that lumbar puncture is a valuable therapeutic measure as well as an exact method of diagnosis in very many conditions involving the cerebrospinal tract.

Ostheimer, M.: Incontinence of Feces In Children. (*University of Pennsylvania Medical Bulletin*, February, 1905, p. 405.)

The author divides these cases into two groups. The first group, in which the cause is either general or local, has the following features: It usually follows on long, lasting, wasting dis-

ease, or from long over-distention of the rectum in chronic constipation. These cases are best treated by a rational diet, outdoor exercise and mild catharsis.

The second group, those cases resulting from nervous disturbance, may be divided into two classes: (a) Those persisting from infancy. These cases may extend beyond puberty. They are best treated by ergot, strychnin and iron. (b) Those appearing after three years. These are usually the result of an indoor life, over-study and lack of exercise. Exercise, diet and tonics sum up the treatment.

Ewart, William: The Principles of Treatment of Pneumonia. (*The Lancet*, January 21, 1905, p. 138.)

Dr. Ewart reviews the pathology and clinical stages of the disease and bases his treatment on the morbid changes. He advises early stimulation followed by free catharsis, combined with diuresis and diaphoresis. To relieve the pulmonary congestion he resorts to leeches applied to the chest and supplements them by blisters. To prevent excessive fibrin formation in the exudate large doses of citrates should be given. As digestive disturbance is to be avoided he recommends a light fluid diet. For cardiac support and stimulation the writer uses oxygen, alcohol or gin, whiskey, etc., and strychnin. If the patient is restless morphin is advised.

Kerley, Charles Gilmore: The Management of Pneumonia in Infants and Children. (*New York and Philadelphia Medical Journal*, April 1, 1905, p. 641.)

The patient's comfort is the first thing to be considered. To this end the child should not be over clothed or over attended and should be kept in a room that is large, light, well ventilated by properly protected windows and at a temperature of from 65° to 70°. There should be but one person in the room at a time. The food strength should be reduced from 50 to 75 per cent. Water should be given freely. The bowels should move at least once a day. The urine should be examined frequently. A high temperature that causes no disturbance calls for no interference. It is only when the respiration becomes rapid and the pulse high that the temperature need be reduced. This may be accomplished without disturbing the child by wrapping the trunk with a wet bath towel at a temperature of 90°F. The patient is then covered with blankets. If this does not reduce the tem-

perature in half an hour the towel may be sprinkled with cooler water without disturbing the child. All drugs that disturb the stomach should be avoided. For a rapid, high tension pulse strophanthus is employed. For a weak, irregular rapid pulse strychnin is preferred. Alcohol should be held in reserve. Nitroglycerin may be used when there is cyanosis and cold feet. Oxygen is best given from the window. Warm saline enemas are of great value. In bronchopneumonia creosote steam inhalations, counterirritants and expectorants are valuable.

Grösz, Julius: Experiments in the Feeding of Sick Infants with Székely's Milk for Children. (*Archiv. für Kinder.*, Vol. XLl., Nos. I. and II., 1905, p. 1.)

Methods employed in the artificial nourishment of infants are still empirical despite the many scientific articles contributed by workers during recent years. The writer reports 22 cases observed during the month of July, 1902, and nourished on Székely's milk for the composition of which the reader is referred to S's article in Vol. XXXVI., Nos. 1 and 2, of the *Archiv. für Kinderheilkunde*. The writer tabulates his results and his conclusions are as follows:—

(1) The 22 infants observed were without exception the offspring of very poor parents. The greater number of the cases were afflicted with digestive disturbance and were seen during the hottest time of the year.

(2) Of the 22 infants only 5 were healthy. Case No. 3 was given Székely's milk exclusively during seven months. At the age of eight and one-half months this infant weighed 10 kg. The remaining 4 infants were observed for but a short space of time. They showed a gain in weight.

(3) Of the sick infants No. 14 was under observation for six months. It suffered from a mild degree of dyspepsia and weighed 7,800 grams at the end of seven months.

(4) Most of the sick infants had suffered from digestive disturbances before they came under observation; they received treatment and were fed upon Székely's milk properly diluted. All these cases, with the exception of the atrophic infant, were cured and subsequently gained weight.

(5) As a result of our observations we are in a position to state that Székely's milk does not favor the development of rachitis.

(6) The great advantage in the case of Székely's milk is the

fact that the small percentage of casein renders it easier of digestion than any other milk preparation. It is a further advantage that the soluble ingredients of milk, especially albumen and sugar are preserved unchanged and that the bactericidal effect of the CO_2 renders sterilization unnecessary.

(7) These results justify us in warmly recommending this preparation as one of the best substitutes for mother's milk.

Variot: The Proper Amount of Nourishment in Cases of Infantile Atrophy. (*Annales de Méd. et Chir. Inf.*, February 15, 1905, p. 128.)

In the suburbs of Paris cases of infantile atrophy are often encountered. This condition is characterized by retarded growth due to gastrointestinal disease. The writer makes a distinction between infants whose development has been temporarily arrested, who improve when fed on sterilized milk, and the large class of athreptic infants of the Parrot type who have progressed to a state of marantic cachexia always incurable. According to the writer the most exact definition of this morbid syndrome has been furnished by Jezourel in his thesis. The conclusions of the latter are stated thus:—

A certain number of breast-fed infants do not prosper because the mother's milk is unsuitable. This is atrophy by inanition. Inanition is often seen in cases where the infant nurses only one breast. The fault here is one of quantity not quality. Too frequent and irregular nursing may produce digestive trouble resulting in atrophy. Sometimes milk too rich in casein or in fat disturbs nutrition and impairs growth. Milk may become toxic and harmful as a result of various diseases to which the mother is subject.

Variot writes that infantile atrophy is rarely the result of organic malformations or of functional insufficiency. The proportion of atrophic breast-fed to bottle-fed infants is 1 to 20. After an experience of more than ten years, Variot is satisfied that sterilized milk of good quality, well and methodically handled, suffices in an immense majority of cases to restore cases of atrophy. Asses' milk did not prove satisfactory in Variot's opinion.

The writer recommends a nursing bottle graduated according to the body weight of the infant, making this the index rather than age. There is no fixed rule by means of which the amount to be given to atrophic infants can be regulated.

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